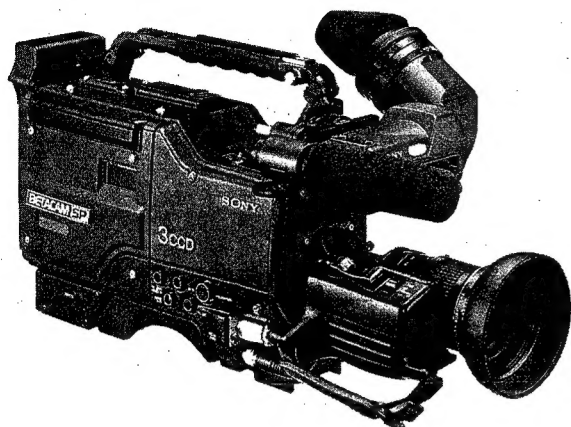


SONY

VTR IN CAMERA

BVW-300AP



BETACAM SP

MAINTENANCE MANUAL

Volume 1 2nd Edition (Revised 3)

Serial No. 41954 and Higher

X-RAY RADIATION WARNING

Be sure that parts replacement in the high voltage block and adjustments made to the high voltage circuits are carried out precisely in accordance with the procedures given in this manual.

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注意：

下記のシリアルナンバー以降より
基板名が変更になったものがあり
ます。従って、このマニュアルに
記載されている基板名称を下記の
ように読み替えてご使用下さい。

NOTE：

The names of some boards have been changed.
In this manual old names may be read as new
names according to the following table.

BOARD CHANGE INFORMATION		SERIAL NUMBER
OLD NAME	⇒ NEW NAME	
PS - 1 6 2	⇒ PS - 1 6 2 B	3 0 9 1 1 AND HIGHER: J 1 1 7 1 3 AND HIGHER: UC
TC - 4 8 A TC - 4 8 A P	⇒ TC - 4 8 B ⇒ TC - 4 8 B P	4 2 0 9 6 AND HIGHER: EK
SW - 2 9 1	⇒ SW - 2 9 1 A	3 0 9 1 6 AND HIGHER: J 1 1 7 4 3 AND HIGHER: UC 4 2 1 3 1 AND HIGHER: EK
VA - 8 3	⇒ VA - 1 6 8	3 2 0 0 1 AND HIGHER: J 1 3 0 0 1 AND HIGHER: UC 4 4 0 0 1 AND HIGHER: EK
AT - 4 9 A	⇒ AT - 4 9 C	
PA - 1 0 1	⇒ PA - 1 5 5	
TG - 5 7 TG - 5 7 P	⇒ TG-162, 163 and 121 ⇒ TG-162P, 163 and 121	
VIEWFINDER		
VF - 3 2 VR - 6 7 SW - 2 6 0 A LP - 4 0 LP - 4 2 LP - 5 8	⇒ VF - 5 0 VR - 1 4 9 SW - 5 6 2 LP - 6 4 LP - 6 5 LP - 6 6 CN - 7 7 1	
IF - 2 9 8	⇒ IF - 2 9 8 A	3 2 0 0 1 AND HIGHER: J 1 3 0 0 1 AND HIGHER: UC

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VOL- 2

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10. SEMICONDUCTOR ELECTRODES

11. SCHEMATIC DIAGRAMS

12. PRINTED WIRING BOARDS

13. SPARE PARTS AND FIXTURE

SECTION 1 TECHNICAL INFORMATION

1-1. SPECIFICATIONS

(with standard playback machine)

(1) General

Power requirements

DC 12V (11V to 17V)

Battery pack NP-1B (Ni-Cd, 2.3Ah)

or NP-1A (Ni-Cd, 1.7Ah)

For AC operation: use optional AC-500 CE

AC adaptor

Power consumption

21 W

(using a metal particle tape, 12V)

Operating temperature

0°C to +40°C

Operating humidity

Less than 85% (relative humidity)

Storage temperature

-20°C to +60°C

Weight

Approx. 4.9 kg

Battery pack

NP-1B, NP-1A: 0.7 kg

BP-90A, BP-90 : 1.7 kg

Dimensions

132 x 208 x 370 mm (w/h/d)

(Not incl. projecting parts and controls)

Video cassette

1/2 inch, cassette tape for Betacam format

Metal particle tape

BCT-5M/10M/20M/30M or equivalent

Oxide tape

BCT-5G/10G/20G/30G or equivalent

Tape speed

Approx. 101.5 mm/sec

Recording playback time

More than 36 minutes (with BCT-30M)

F.FWD time

Less than 9 minutes (with BCT-30M)

REW time

Less than 5 minutes (with BCT-30M)

Continuous Operating time

Approx. 75 minutes (with NP-1B)

(2) CONNECTOR

AUDIO IN CH-1/CH-2 (REAR)	XLR-3 pin (female)
GENLOCK VIDEO IN	BNC
TC IN	BNC
TC OUT	BNC
VIDEO OUT 1/2	BNC
EARPHONE OUT	Mini jack
PB ADAPTOR	20 pin
LENS	12 pin
REMOTE	6 pin
VF	20 pin
DC IN	XLR-4 pin
DC OUT 12V	4 pin
MIC IN (FRONT)	XLR-3 pin (female)

(3) CAMERA

CAMERA

Imager 2/3-inch interline-transfer, 3 chip

Imager configuration

RGB 3-CCDs

Spectral system

F1.4 prism system (with quartz filter)

Built-in filters

1:3200K

2:5600K + 1/4 ND

3:5600K

4:5600K + 1/16 ND

Lens mount

Special bayonet type

Video output

1.0 Vp-p, 75 ohms, unbalanced,
sync negative, two outputs

Sensitivity

2000 lux with F8 (typical),
89.9 % reflection

Minimum subject illumination

7.5 lux (F1.4 with +18 dB gain setting)

Video signal-to-noise ratio

60 dB (typical)

Horizontal resolution

700 TV lines (at center)

Registration

0.05 % or less on entire screen
(without lens)

Geometric distortion

Not identified (without lens)

VIEWFINDER

Picture tube

1 1/2 inch monochrome, quick start type
with BRIGHT control, CONTRAST control,
PEAKING control, TALLY switch,
ZEBRA/MARKER switch, AUDIO/TAPE INDICA-
TOR switch,
AUDIO LEVEL CH-1 control

Resolution

550 TV lines (at center)

(4) VTR

Video system

With a metal particle tape

Bandwidth

Luminance (50%) :

25 Hz to 5.5 MHz +0.5/-3.0 dB

Chrominance :

30 Hz to 1.5 MHz +0.5/-3.0 dB

S/N

Luminance* :

More than 48 dB

Color difference :

More than 48 dB

Low frequency non-Linearity

Less than 3 %

Pulse shape distortion (K-pulse 2T)

Less than 2 %

Y/C delay

Less than 20 nsec

With an oxide tape

Bandwidth

Luminance :

25 Hz to 4.0 MHz +0.5/-6.0 dB

Chrominance :

30 Hz to 1.5 MHz +0.5/-3.0 dB

S/N

Luminance* :

More than 46 dB

Color difference :

More than 45 dB

Low frequency non-Linearity

Less than 4%

Pulse shape distortion (K-pulse 2T)

Less than 3 %

Y/C delay

Less than 20 nsec

* The input/output levels of the component signals
conform to the EBU "N-10" standard.

Audio system

Longitudinal (Audio channel 1, 2)

With a metal particle tape

Frequency response (20 dB below peak level)*1

50 Hz to 15 kHz +1.5/-3.0 dB

S/N*2 More than 62 dB

Distortion (at 1 kHz)

at peak level*1 Less than 3 %

at OVU level Less than 1.5 %

Cross talk (at 1 kHz)

Less than -55 dB

Wow and flutter (DIN 45507)

Less than 0.15 %

Depth of erasure (at 1 kHz)

More than 65 dB

With an oxide tape

Frequency response (20 dB below peak level)*1

50 Hz to 15 kHz \pm 3.0 dB

S/N*2 More than 58 dB (with DOLBY NR on)

Distortion (at 1 kHz)

at peak level*1 Less than 3 %

at OVU level Less than 2 %

Cross talk (at 1 kHz)

Less than -55 dB

Wow and flutter (DIN 45507)

Less than 0.15 %

Depth of erasure (at 1 kHz)

More than 65 dB

AFM (Audio channel 1,2 recorded metal tape)

Frequency response (20 dB below peak level)*1

20 Hz to 20 kHz +0.5/-2.0 dB

S/N*2 More than 68 dB

Distortion (at 1 kHz)

at peak level*1 Less than 3 %

at OVU level Less than 0.6 %

Cross talk (at 1 kHz)

Less than -65 dB

*1) Peak level AFM: +19 VU, LNG: +8 VU

*2) Referred to peak level, weighted CCIR468-3,
with Audio N.R.

(5) Microphone

Gun-directional, for the phantom power supplied system

1-2. INPUT/OUTPUT SIGNALS OF THE CONNECTORS

INPUT

AUDIO IN (REAR)	BVW-300AP: -60 dBu / + 4 dBu (selectable) high impedance, balanced
GENLOCK VIDEO IN	1.0 Vp-p, 75 ohms
TC IN	0.5 to 18 Vp-p, 10 kohms
DC IN	11 to 17 V

MIC IN (FRONT)

BVW-300AP: -60 dBu
(0 dBu = 0.775 Vrms)



OUTPUT

VIDEO OUT	1.0 Vp-p, 75 ohms
TC OUT	1.0 Vp-p, 75 ohms
DC OUT	11 to 17 V

VF CONNECTOR (20P)

No.	SIGNAL	SPECIFICATION
1	VTR SAVE	SAVE: 0V, STBY: 4.5V
2	NC	_____
3	NC	_____
4	NC	_____
5	MARKER ON/OFF	ON: 0V, OFF: +4.6 V
6	CCIR/EIA	CCIR: +8.5 V, EIA: 0 V, Zo = 1 kΩ
7	AUDIO IND ON/OFF	ON: +4.6 V or OPEN, OFF: 0 V, Zo = 1.5 kΩ
8	VF VIDEO (G)	GND
9	NC	_____
10	NC	_____
11	ZEBRA ON/OFF	ON: 0 V, OFF: OPEN or +9.3 V
12	VF VIDEO (X)	Zo ≤ 100Ω 1 Vp-p
13	AU LEVEL CONT	0 V (0 dB) to +7 V (-20 dB)
14	NC	_____
15	NC	_____
16	H:BATT IND	ON: +5 V, OFF: 0 V or OPEN
17	REC/ALARM	ON: +9 V, OFF: 0 V or OPEN
18	+9.3 V (VF)	+9.3 V
19	UNREG GND	GND
20	UNREG +12V	+11 V to +17 V

REMOTE CONNECTOR (6P)

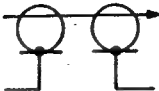

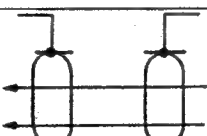
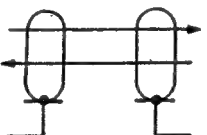







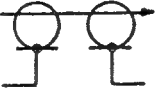
No.	SIGNAL	SPECIFICATION
1	L:VTR START/STOP	TRIG:  5 Vp-p
2	CAMERA SD	SERIAL DATA  +4.6 V 0 V
3	UNREG GND	GND
4	NC	_____
5	REC ALARM	ON: +9 V, OFF: 0 V or OPEN
6	UNREG +12V	+11 V to +17 V

CCZ CONNECTOR (26P)


Fit the VTR connector unit BKW-402 (option) to the main unit and connect with BVW-35P/25P, VA-5P and BVV-5PS by CCZ cable.

No.	SIGNAL	BVW-300A	DIRECTION	EXT VTR SIDE
1	VBS OUT (X)	$Z_o = 75\Omega$ 1Vp-p ± 1 dB DC = 0 \pm 100mV	\longrightarrow	$Z_i = 75\Omega$
2	VBS OUT (G)			
3	Y VIDEO OUT (G)	$Z_o = 75\Omega$ 1Vp-p ± 0.5 dB DC = 0 \pm 200mV	\longrightarrow	$Z_i = 75\Omega$
4	Y VIDEO OUT (X)			
5	R-Y VIDEO OUT (X)	$Z_o = 75\Omega$ 525mVp-p EBU N-10 LEVEL (75% color bars)	\longrightarrow	$Z_i = 75\Omega$
6	R-Y VIDEO OUT (G)			
7	B-Y (X)	$Z_o = 75\Omega$ 525mVp-p EBU N-10 LEVEL (75% color bars)	\longrightarrow	$Z_i = 75\Omega$
8	B-Y (G)			
9	AUDIO CH1 (X)	-60dBm $Z_o \leq 600\Omega$ (BALANCED)	\longrightarrow	$Z_i = 3K\Omega \sim 10K\Omega$ (BALANCED)
10	AUDIO CH1 (Y)			
11	AUDIO CH1 (Z)			
12	VTR START/STOP	START : 4.5 \pm 0.5Vdc STOP : 0 \pm 0.5Vdc $Z_o \leq 10K\Omega$	\longrightarrow	START: 5 \pm 1V STOP: 0 \pm 0.3V or OPEN
13	NC	_____		_____
14	NC	_____		_____
15	REC ALARM IN	$Z_i \geq 20K\Omega$	\longleftarrow	_____
16	NC	_____		_____
17	SHIELD	CHASSIS	\longleftrightarrow	GND
18	RET VIDEO IN (X)	$Z_i = 75\Omega$	\longleftarrow	$Z_o = 75\Omega$ 1Vp-p ± 1 dB DC = 0 \pm 200mV
19	RET VIDEO IN (G)			
20	VTR SAVE	SAVE : 4.5 \pm 0.5V STBY: 9 \pm 0.5V $Z_o \leq 10K\Omega$	\longrightarrow	
21	NC	_____		_____
22	COLOR FRAMING	5 \pm 1V	\longrightarrow	$Z_i \geq 100K\Omega$
23	NC	_____		_____
24	NC	_____		_____
A	POWER SENSE IN		\longleftarrow	min. 11V Max. 17V
B	UNREG GND			

PB ADAPTOR CONNECTOR (20P)



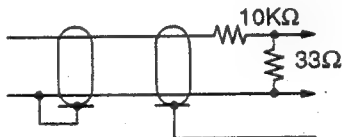



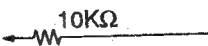
No.	SIGNAL	VTR	DIRECTION	PB ADAPTOR
1	Y-RF (X)	75 Ω (OXIDE=0.1 Vp-p) METAL=0.2 Vp-p (Center Carrier)		Z = 75 Ω
2	Y-RF (G)			
20	C-RF (X)	75 Ω (OXIDE=0.1 Vp-p) METAL=0.2 Vp-p (Center Carrier)		Z = 75 Ω
19	C-RF (G)			
3	AUDIO CH1 (X)	LOW Impedance -10 dBu		Z = 10 k Ω
5	AUDIO CH2 (X)			
4	AUDIO (G)			
16	Y SW PULSE (X)	1,3 CH : H 2,4 CH : L OPEN COLLECTOR		Z = 10 k Ω , Pull up +5 V
18	ADVANCE SYNC (X)	Z = 75 Ω		2 \pm 0.5 Vp-p, 75 Ω
15	ADVANCE SYNC (G)			
6	CONTROL SIG. 1	METAL "H" FF/REW "M" OXIDE "L" H = 5.0 V M = 2.5 V L = 0 V		High impedance
17	CONTROL SIG. 2	PLAY : HIGH (> 6.5 V) Z = 10 k Ω		Z = 57 k Ω
9	VIDEO (X)			Z = 75 Ω 1 Vp-p
10	VIDEO (G)			
7	GND			
8	GND			
13	+12 V			
14	+12 V			
12	C SW PULSE (X)	1,3 CH : L 2,4 CH : H (0.3V)		Z = 75 Ω
11	C SW PULSE (G)	EMITTER FOLLOWER (OPEN)		

LENS CONNECTOR (12P)

No.	SIGNAL	SPECIFICATION
1	L:PB CONT	ENABLE: 0 V, DISABLE: +5 V or OPEN
2	L:VTR START/STOP	TRIG: 0 V  5 Vp-p
3	UNREG GND	GND
4	AUTO +5V	AUTO: +5 V, MANU: 0 V or OPEN
5	IRIS CONT	+3.4 V (F16) to +6.2 V (F2.8)
6	UNREG +12V	+11 V to +17 V
7	IRIS POS	+3.4 V (F16) to +6.2 V (F2.8)
8	REMOTE/LOCAL	REMOTE MODE: +4.6 V, LOCAL MODE: 0 V
9	EXTENDER ON/OFF	ON: 0 V, OFF: +4.6 V or OPEN
10	NC	_____
11	NC	_____
12	NC	_____

PB ADAPTOR CONNECTOR (20P)

• When the unit is connected with the BVW-35P/25P by the optional connection cable CCRZ-5.

No.	SIGNAL	REMARKS FOR SIGNAL	DIRECTION	BVW-35P/25P 26 PIN No.
1	W35 REC / ALARM IN	0V, +2.5V, +5Vdc		15
20	W35 START / STOP	START: 4.5 Vdc STOP: 0Vdc		12
3	AUDIO CH1 (X) OUT	Output -10dBu		9
4	AUDIO CH1 (G) OUT			10 11
18	RETURN VIDEO (X) IN	1.0Vp-p, 75Ω		18
15	RETURN VIDEO (G) IN			19
9	VIDEO OUT (X)	1.0Vp-p, 75Ω		1
10	VIDEO OUT (G)			2
7	GND			B
8	GND			
12	INTERFACE SENCE	UNREG +12V IN		A

1-3. APPLICABLE CONNECTOR

When external cables are connected to the various connectors on the connector panel during maintenance, the hardware listed below (or equivalents) must be used.

Panel indication	Applicable connector
AUDIO IN	1-508-084-00 CONNECTOR, XLR, 3P, MALE
DC IN	1-508-362-00 PLUG, XLR, 4P, FEMALE
TC IN/OUT	1-560-069-11 PLUG, BNC, MALE
GENLOCK VIDEO IN	1-560-069-11 PLUG, BNC, MALE
VIDEO OUT	1-560-069-11 PLUG, BNC, MALE
PB ADAPTOR	1-566-771-11 PLUG, 20P MALE
MIC IN	1-508-084-00 CONNECTOR, XLR, 3P MALE
REMOTE	1-560-078-00 CONNECTOR, 6P, MALE
DC OUT	1-565-654-11 CONNECTOR, ROUND TYPE 4P
EXT VTR (OPTION: BKW-402)	1-564-184-21 PLUG, CONNECTOR (SOCKET) 26P, FEMALE

1-4. SETTING OF THE SYSTEM SELECT CIRCUIT

Along with the select switches and controls on the side panel, some internal system select circuits are on the circuit boards.

• TC-48AP Board

(1) SL7

Set the condition to TC generator is put into the power save mode.

When the battery is disconnected, TC generator is put into the power save mode: SL7 is opened.

When the POWER switch is turned OFF, TC generator is put into the power save mode: SL7 is shorted.

When the unit is shipped, SL7 is opened.

(2) SL8

Selects whether the color frame flag should be set or not, when the color frame flag is locked.

Set the color frame flag : SL8 is opened.

Does not set the color frame flag : SL8 is shorted.

When the unit is shipped, SL8 is opened.

(3) SL10, SL11

Selects the power supply while TC is power save mode.
UNSW +12V : SL10 is shorted, SL11 is opened,
(TC generator : ON)

UNREG +12V : SL10 is opened, SL11 is shorted.
(TC generator : OFF)

When the unit is shipped, SL10 is shorted.

(4) S517 SLAVE U-BIT INT/EXT SW

Selects whether the U-bit is slaved by internal or external, when locking the slave.

When the unit is shipped, this switch is set to the INT position.

(5) S518 REAL TIME VITC/LTC SW

Selects whether the real time is recorded on the VITC or the LTC.

When the unit is shipped, this switch is set to the VITC position.

(6) S103, S203 LIMITER ON/OFF SW

When turned OFF, audio level limiter is released.

S103: CH-1

S203: CH-2

When the unit is shipped, these switches are set to the ON position.

• SY-117CP Board

(1) S1 SLACK MUTE SW

When turned ON, detection of the slack is muted. Normally set to the OFF position.

When the unit is shipped, this switch is set of the OFF position.

• VA-83/168 Board

(1) S1 GAIN SELECT SW

By setting the GAIN selector (side panel) to "18", the video output level can be raised by 18 dB or 24 dB with this switch. (Refer to Sec. 1-5.)

In case of changed this switch, be sure to perform the +18 dB Black Set Adjustment for R, G and B video signals respectively.

When the unit is shipped, this switch is set to the 18 dB position.

• IE-30AP Board

(1) S1 DTL ON/OFF SW

Selects whether the detail signal which generated from the IE-30AP board for resolution improvement should be added to the video signal or not.

Turn ON this switch : add the detail signal.

When the unit is shipped, this switch is set to the ON position.

• IE-31 Board

(1) APERTURE ON/OFF (S2)

This switch is used to turn ON or OFF the aperture circuit. The circuit does not work with this switch set to OFF. Normally set to ON.

• PR-176 Board

(1) S1, S2, S3 (R γ, G γ, B γ)

When turned ON, the gamma correction is performed so that the overall characteristic of signals between camera and monitor is " $\gamma=1$ ". Normally set to the ON positions. When the unit is shipped, these switches are set to the ON position.

(2) S5 WHITE CLIP & KNEE ON/OFF SW

When turned OFF, the white clipping and knee correction are automatically disabled. This switch is used for the video circuit adjustment. Normally set to the ON positions.

When the unit is shipped, these switches are set to the ON position.

(3) S4 MASK ON/OFF SW

When turned ON, LINEAR MATRIX circuit is turned ON and obtain the high saturated color reproduction.

If need require, set to the ON position.

When the unit is shipped, this switch is set to the ON position.

• EN-79P Board

(1) S1, S2 R-Y ON/OFF, B-Y ON/OFF SW

When turned ON, the R-Y and/or B-Y signal is added to the each encoder circuit. These switches are used for the encoder circuit adjustment. Normally set to the ON positions.

When the unit is shipped, these switches are set to the ON positions.

(2) S3 Y/G SELECT SW

When set to the G position, the composit signal from VIDEO OUT connector is changed to G signal.

And at the same time, "MONITOR MODE" is displayed on the Viewfinder.

This switch is used for the camera block adjustment. Normally set to the ENC position.

When the unit is shipped, this switch is set to the ENC position.

• SG-152P Board, SG-157P Board

(1) S2 H BLKG SELECT SW

Adjusts the horizontal blanking width.

When the unit is shipped, this switch is set to $12.0 \pm 0.2 \mu\text{s}$.

(2) S3 TEST SAW SW

When turned ON, the lens is forcibly closed and the TEST SAW waveform is added to the video signal circuit.

This switch is used for the video circuit adjustment. Normally set to the OFF position.

When the unit is shipped, this switch is set to the OFF position.

(3) EXT SC 0/180 (S4/SG-157P)

This switch turns SC (subcarrier) phase of the output signal in GENLOCK mode. If adjustment is not completed by EXT SC VR, set this switch to the opposite position to setting position.

When the unit is shipped, this switch is set to the 0 position.

• **AT-49A Board**

(1) **CHECK, FP INH SW (S1)**

CHECK (S1-2) (AT-49A Board only)

When turned ON, the diagnostic for the camera circuit can be performed.

Normally set to the OFF position.

When the unit is shipped, this switch is set to the OFF position.

FP INH (S1-1)

When set to the OFF (OPEN) position, the white balance compensation values for each filter can be stored in the memory A and memory B independently. Then 8 adjusted values; 4 for the memory A and 4 for the memory B can be stored. When set to the ON position, only 2 compensation values; one for memory A and one for memory B can be stored. In this case, the compensation values will not correspond to the selection of the color temperature conversion filter. According to the selection of WHITE BAL switch (on the side panel), the white balance compensation values are stored and read out from the memory A and memory B.

When the unit is shipped, this switch is set to the OFF position.

(2) **MEMORY RESET SW (S2)**

Use for the compensation data stored in the microcomputer can be reset. When set to the RESET position, indicates "MEMORY RESET" in the Viewfinder and resets the compensation data.

After confirm this indication, set this switch to the OPERATE position.

When the unit is shipped, this switch is set to the OPERATE position.

• **IF-298AP Board**

(1) **VTR MODE (EXT ONLY/PARALLEL) (S1)**

This switch is effective when the external VTR is connected with BKW-402 (option) or S2 is set to ON.

When you select PARALLEL, both built-in VTR of the BVW-300AP and external VTR connected through the BKW-402 operate and enable simultaneous recording.

If you select EXT ONLY, only the external VTR operates. Normally, This switch is set to PARALLEL.

(2) **26P INTERFACE (S2)**

Normally, the interface circuit operates automatically when an external VTR is connected through the 26-pin connector; the circuit does not operate if the external VTR is not connected (The power saving circuit of IF board will activate). If this switch is set to ON, however, the interface circuit operates and a signal is output from 26-pin connector even when the external VTR is not connected.

Normally, this switch is set to OFF.

(3) **CENTER MARKER ON/OFF (S3)**

When this switch is set to ON, you can use the viewfinder MARKER switch to display the CENTER MARKER on the viewfinder.

Normally, this switch is set to ON.

(4) **SAFETY ZONE ON/OFF (S4)**

When this switch is set to ON, you can use the viewfinder MARKER switch to display the SAFETY ZONE on the viewfinder.

Normally, this switch is set to ON.

(5) **SAFETY ZONE 80/90% (S5)**

Selects the range of the SAFETY ZONE to either 80% or 90% when S4 (SAFETY ZONE) is set to ON.

Normally, this switch is set to 90%.

(6) **EXT VTR INDEPENDENT ON/OFF (S6)**

Usually, the external VTR is controlled by the VTR START/STOP switch of the BVW-300AP. When this switch is set to ON, the external VTR can be controlled independently by itself. Normally, this switch is set to OFF.

(7) **MARKER ON (S7)**

Unlike regular viewfinders, the 3" or 5" viewfinder does not have the marker ON/OFF switch on the viewfinder. Set the MARKER ON to ON to have the marker appear in the viewfinder when the 3" or 5" viewfinder is used.

(8) **N/P (S8)**

The mode of the marker generator can be set either to NTSC or PAL.

• SW-260A Board

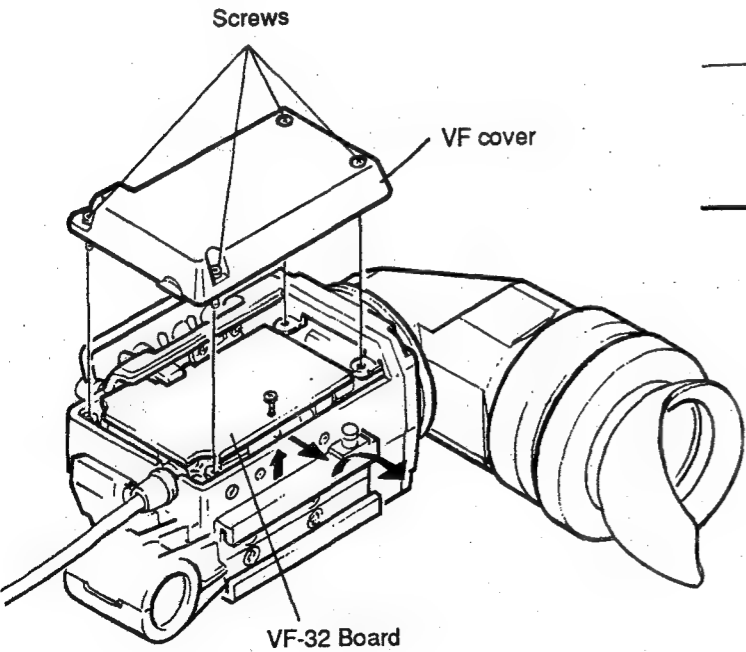
(1) SL1, SL2

By shorting SL1 or SL2, two indications ZEBRA and CENTER MARKER can be displayed at the same time on the viewfinder screen.

ZEBRA/MARKER SW	NORMAL	SL1 SHORT	SL2 SHORT
ZEBRA ON	ZEBRA	ZEBRA	ZEBRA + MARKER
OFF	OFF	OFF	OFF
MARKER ON	MARKER	MARKER + ZEBRA	MARKER

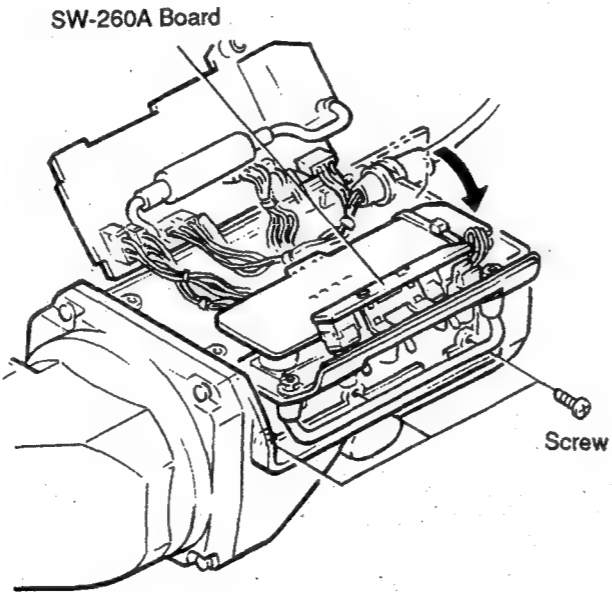
• Modification procedure

- 1. Loosen four screws and remove the VF cover.
- 2. Remove the screw securing the VF-32 board and open the VF-32 board in the direction of arrow.



BOARD CHANGE INFORMATION		
OLD NAME	NEW NAME	SERIAL NUMBER
VIEWFINDER		44001 and higher
VF-32	VF-50	
LP-58	LP-64	
LP-40	LP-65	
LP-42	LP-66	
VR-67	VR-149	
SW-260A	SW-562	
	CN-771 (added)	

- 3. Remove three screws securing the switch panel and open the panel.
- 4. Solder and short SL1 or SL2 on the SW-260A board.



1-5. GAIN CHANGES

The gains of 0-9-18 dB can be selected with the GAIN selector (on the side panel). But the video output level can be raised by 24 dB at the 18 dB position of GAIN selector. Therefore the following two types gain can be set.

0-9-18 dB
and
0-9-24 dB

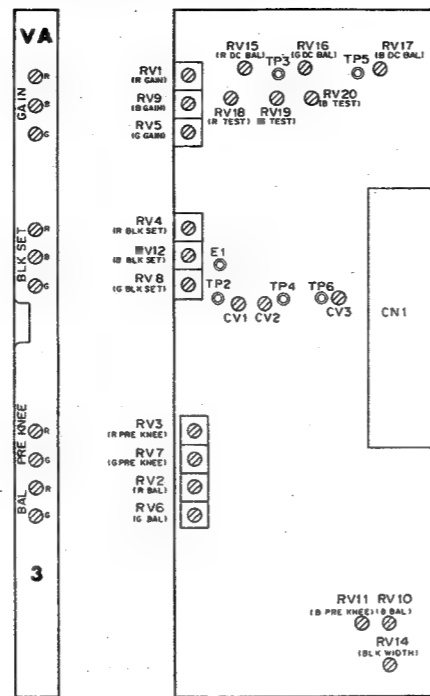
• Changing from 18 dB into 24 dB

By setting the S1 (GAIN SELECT SW) on the VA-83 board to the 24 dB position, the video output level can be raised by 24 dB at the 18 dB position of GAIN selector (on the side panel). When this switch is changed; 18 dB to 24 dB or 24 dB to 18 dB, be sure to perform the +18 dB Black Set Adjustment. (Refer to Sec. 7-4-10)

1-6. LEVEL CHECK SHEET

1. Set the lens iris to F8 position and confirm that the signal level at CN1-8/VA-168 board is 0.275 ± 0.01 Vp-p.
CN1-8/VA-83 board is 0.13 ± 0.01 Vp-p.
2. Adjust the RV5(G GAIN)/VA-83/168 board so that the video level at CN1-45/PR-176 board is 0.5 ± 0.01 Vp-p.
3. Adjust the RV1 (R GAIN)/VA-83/168 board so that the video level at CN1-41/PR-176 board is 0.5 ± 0.01 Vp-p.
4. Adjust the RV9 (B GAIN)/VA-83/168 board so that the video level at CN1-43/PR-176 board is 0.5 ± 0.01 Vp-p.
5. Set the S3 (TEST SAW)/SG-152P board to the ON position.
6. Adjust the RV19 (G TEST)/VA-83/168 board so that the video level at CN1-45/PR-176 board is 0.5 ± 0.01 Vp-p.
7. Adjust the RV18 (R TEST)/VA-83/168 board so that the video level at CN1-41/PR-176 board is 0.5 ± 0.01 Vp-p.
8. Adjust the RV20 (B TEST)/VA-83/168 board so that the video level at CN1-43/PR-176 board is 0.5 ± 0.01 Vp-p.
9. Adjust the RV21 (G GAIN 1)/PR-176 board so that the video level at the TP2/PR-176 board is 2.00 ± 0.01 Vp-p.
10. Adjust the RV1 (R GAIN1)/PR-176 board so that the video level at the TP1/PR-176 board is 2.00 ± 0.01 Vp-p.
11. Adjust the RV25 (B GAIN1)/PR-176 board so that the video level at the TP3/PR-176 board is 2.00 ± 0.01 Vp-p.
12. Turn OFF the S2 (G_Y)/PR-176 board and adjust the RV16 (G GAIN)/PR176 board so that the video level at the CN1-42/EN-79U board is 0.7 ± 0.01 Vp-p.
13. Turn OFF the S1 (R_Y)/PR-176 board and adjust the RV15 (R GAIN)/PR176 board so that the video level at the CN1-43/EN-79P board is 0.7 ± 0.01 Vp-p.
14. Turn OFF the S3 (B_Y)/PR-176 board and adjust the RV17 (B GAIN)/PR176 board so that the video level at the CN1-41/EN-79P board is 0.7 ± 0.01 Vp-p.
15. Turn ON the S2 (G_Y)/PR-176 board and adjust the RV24 (G_YBAL)/PR176 board so that the video level at the CN1-42/EN-79P board is 0.7 ± 0.01 Vp-p.
16. Turn ON the S1 (R_Y)/PR-176 board and adjust the RV38 (R_YBAL)/PR176 board so that the video level at the CN1-43/EN-79P board is 0.7 ± 0.01 Vp-p.
17. Turn ON the S3 (B_Y)/PR-176 board and adjust the RV29 (B_YBAL)/PR176 board so that the video level at the CN1-41/EN-79P board is 0.7 ± 0.01 Vp-p.

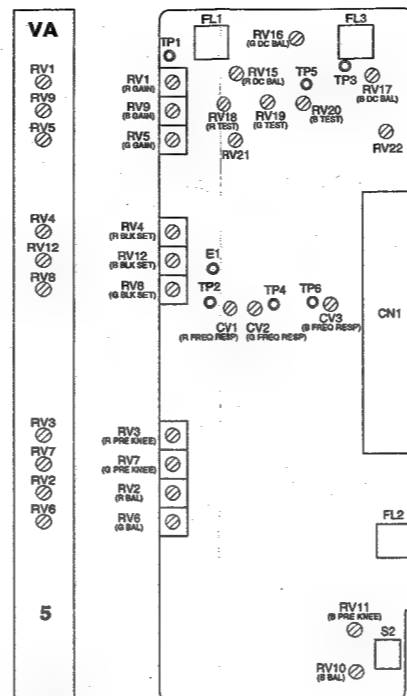
S/N: 41954 through 43999



VA-83 BOARD
(PANEL SIDE)

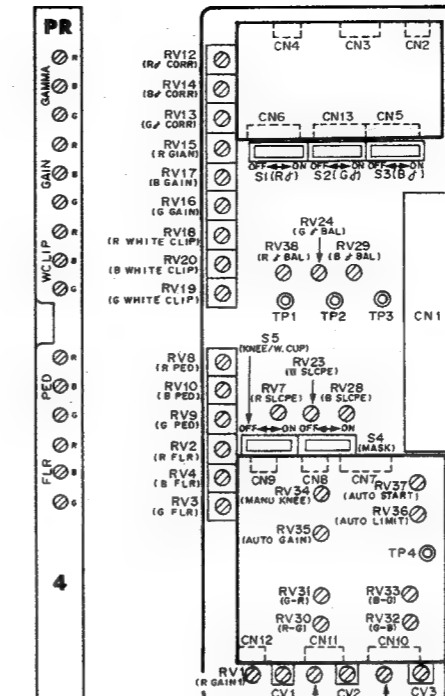
VA-83 BOARD (COMPONENT SIDE)

S/N: 44001 and higher



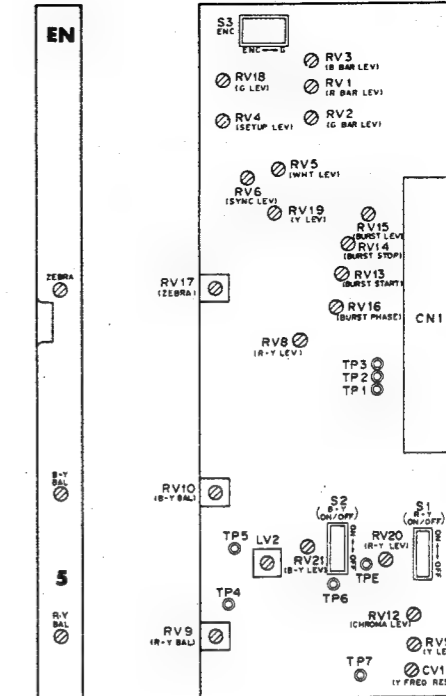
VA-168 BOARD
(PANEL SIDE)

VA-168 BOARD (COMPONENT SIDE)



PR-176 BOARD
(PANEL SIDE)

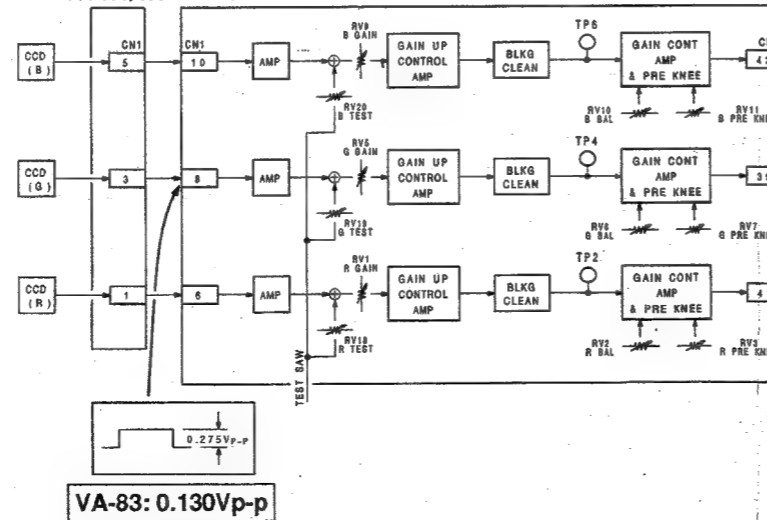
PR-176 BOARD (COMPONENT SIDE)



EN-79P BOARD
(PANEL SIDE)

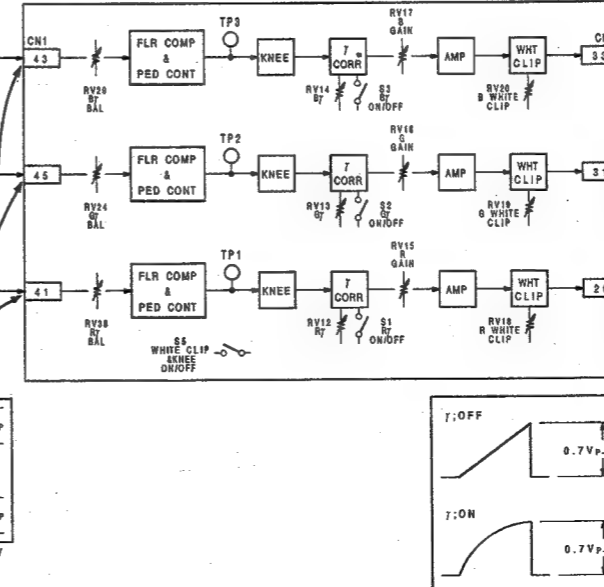
EN-79P BOARD (COMPONENT SIDE)

PA-101/155 VA-83/168

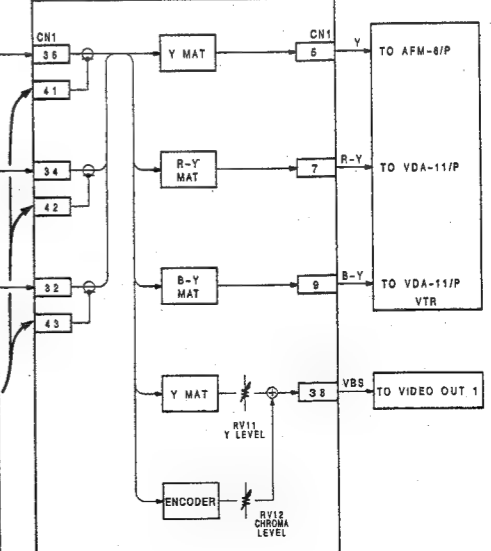


VA-83: 0.130Vp-p

PR-176



EN-79P



1-7. DIAGNOSTIC MODE

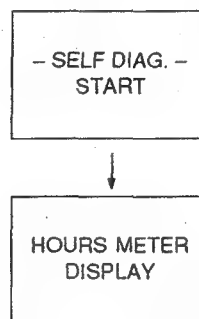
BVW-300AP is provided with a diagnostic function. This function displays on the viewfinder and the LCD display on the side panel.

The LCD display also displays the hours meter, and more, battery before end voltage adjustment can also perform on this LCD display.

1-7-1. Operation

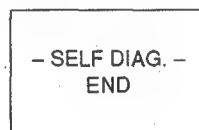
1. Put the unit into STOP mode.
2. Press the DIAGNOSTIC switch on the side panel with a pencil lead or similar object and put into DIAGNOSTIC mode.

Display on the monitor as follows.



(MODE "0", Hours meter is displayed on the LCD display.)

3. Press the ADVANCE button on the side panel, and shift the mode step by step.
4. Press the SHIFT button and perform the mode.
5. When this DIAGNOSTIC mode is ended, press the DIAGNOSTIC switch again.



1-7-2. Mode Table

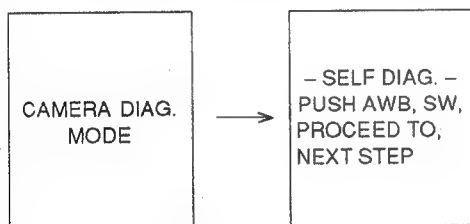
MODE	ITEM/CONTENTS
0	<p>HOURS METER</p> <ul style="list-style-type: none"> • DRUM RUNNING METER • TAPE RUNNING METER • OPERATION METER <p>It is recommended to perform the periodic checks and maintenance based on the hours meter. (Refer to Sec. 2-2)</p>
1	<p>Display and setting of battery before end voltage</p> <p>Display the voltage of battery before end and can be changed. (Refer to Sec. 1-14)</p>
2	<p>LCD display check</p> <p>Check that LCD display's 7 segments are all turned on or off, all lights is put out or not by pressing the SHIFT button.</p>
3	<p>EEPROM check</p> <p>Check that EEPROM on the TC-48AP board is activated normally, and TC-48AP circuit is operated normally. Press the SHIFT button and displayed on the LCD display as follows.</p> <ul style="list-style-type: none"> • EEPROM : OK <p style="text-align: center;">3-0</p> <ul style="list-style-type: none"> • EEPROM : NG <p style="text-align: center;">3-E</p> <p>When EEPROM is not activated normally, check the TC-48AP circuit or replace the EEPROM.</p>
4	<p>Diagnostic of CAMERA system</p> <ul style="list-style-type: none"> • Switch interface check • AUTO circuit check
5	<p>Diagnostic of VTR system (1)</p> <ul style="list-style-type: none"> • Function key interface check • Function lamp check
6	<p>Diagnostic of VTR system (2)</p> <ul style="list-style-type: none"> • Photo interruptor check

MODE	ITEM/CONTENTS
7	Diagnostic of VTR system (3) <ul style="list-style-type: none"> • Photo interruptor check • Tape beginning sensor check • Tape end sensor check
8	Diagnostic of VTR system (4) <ul style="list-style-type: none"> • Drum rotation check • Capstan rotation check • Reel FG (take-up side) check • Reel FG (supply side) check

1-7-3. Self Diagnostic Function (AT-49A Board only)

(1) Camera system

1. Press the ADVANCE button so that the MODE "4" is displayed. Then press the SHIFT button.



(NOTE) Self diagnostic function of camera system independently can be performed as the following procedures in the normal operation.
Set the internal switch as follows.

S1-2 (CHECK) on the AT-49A board : ON

Set this switch to the OFF position, the unit returns to the normal operation.

2. Set the AUTO W/B BAL switch to "WHT", the unit advances to next step.
3. When "NG" is indicated, check a related circuit.

STEP	Setting	LCD display	VF screen	Related circuit
		4	<div>– SELF DIAG. – PUSH AWB. SW. PROCEED TO. NEXT STEP</div>	
1	S3 (TEST SAW)/ SG-152P board: ON or Shoot a suitable object.	4	<div>– SELF DIAG. – STEP 1 R. GAIN: OK PUSH AWB. SW.</div> <div>– SELF DIAG. – STEP 1 B. GAIN: OK PUSH AWB. SW.</div>	<div>• AT-49A board IC9→RB3→IC10(2/2)→IC12→CN1-22 IC2→IC3→IC1→IC6→IC7</div> <div>• VA-83 board CN1-30→IC3</div> <div>• AT-49A board IC9→RB3→IC10(2/2)→IC12→CN1-23 IC2→IC3→IC1→IC6→IC7</div> <div>• VA-83 board CN1-31→IC9</div>
2	Close the lens iris. (When the lens is not closed, the following message is displayed until it is closed.) <div>STEP 2: LENS: NOT CLOSED</div>	4	<div>– SELF DIAG. – STEP 2 G. BLACK : OK PUSH AWB. SW.</div> <div>– SELF DIAG. – STEP 2 R. BLACK : OK PUSH AWB. SW.</div> <div>– SELF DIAG. – STEP 2 B. BLACK : OK PUSH AWB. SW.</div>	<div>• AT-49A board IC9→RB3→IC10(2/2)→IC12→CN1-25 IC2→IC3→IC1→IC6→IC7</div> <div>• VA-83 board CN1-33→IC15-52→IC15-53</div> <div>• AT-49A board IC9→RB3→IC10(2/2)→IC12→CN1-24 IC2→IC3→IC1→IC6→IC7</div> <div>• VA-83 board CN1-32→IC15-46→IC15-47</div> <div>• AT-49A board IC9→RB3→IC10(2/2)→IC12→CN1-26 IC2→IC3→IC1→IC6→IC7</div> <div>• VA-83 board CN1-34→IC15-50→IC15-51</div>

STEP	Setting	LCD display	VF screen	Related circuit
3	Close the lens iris. <div> When the lens is not closed, the following message is displayed until it is closed. </div> <div> STEP 3: LENS: NOT CLOSED </div>	4	<div> – SELF DIAG. – STEP 3 R. PED : OK PUSH AWB. SW. </div>	<ul style="list-style-type: none"> • AT-49A board IC9→RB3→IC10(2/2)→IC12→CN1-35 IC2→IC3→IC1→IC6→IC7 • PR-176 board CN1-37→IC2
			<div> – SELF DIAG. – STEP 3 B. PED : OK PUSH AWB. SW. </div>	<ul style="list-style-type: none"> • AT-49A board IC9→RB3→IC10(2/2)→IC12→CN1-36 IC2→IC3→IC1→IC6→IC7 • PR-176 board CN1-38→IC7
4	GAIN selector: 0 OUTPUT/DCC selector: DCC OFF WHITE BAL selector: A S3(TEST SAW)/ SG-152P board: OFF	4	<div> – SELF DIAG. – STEP 4 AUTO IND OK? PUSH AWB. SW. </div>	
5	GAIN Selector (on the side panel) : 18	4	<div> – SELF DIAG. – STEP 5 SET 18 DB : OK PUSH AWB. SW. </div>	<ul style="list-style-type: none"> • SW-220 board S2 • MB-317AP board CN54-A3 <ul style="list-style-type: none"> • AT-49A board CN1-28 • IE-30AP board CN1-34 • VA-83 board CN1-35
	GAIN Selector (on the side panel) : 9	4	<div> – SELF DIAG. – STEP 5 SET 9 DB : OK PUSH AWB. SW. </div>	<ul style="list-style-type: none"> • SW-220 board S2 • MB-317AP board CN54-B3 <ul style="list-style-type: none"> • AT-49A board CN1-29 • IE-30AP board CN1-35 • VA-83 board CN1-36

STEP	Setting	LCD display	VF screen	Related circuit
5	OUTPUT/DCC selector (on the side panel) : BARS/OFF	4	<div> – SELF DIAG. – STEP 5 SET BARS: OK PUSH AWB. SW. </div>	<ul style="list-style-type: none"> • SW-220 board S3 • MB-317AP board CN54-B5 • AT-49A board CN1-43 • EN-79P board CN1-45 • SG-152P board CN1-37
	S3 (TEST SAW)/ SG-152P board: ON	4	<div> – SELF DIAG. – STEP 5 SET TEST : OK PUSH AWB. SW. </div>	<ul style="list-style-type: none"> • SG-152P board S3→CN1-12 • AT-49A board CN1-47 • VA-83 board CN1-24 • DR-84 board CN1-5
	OUTPUT/DCC selector (on the side panel) : CAM/ON	4	<div> – SELF DIAG. – STEP 5 SET DCC : OK PUSH AWB. SW. </div>	<ul style="list-style-type: none"> • SW-220 board S3 • MB-317AP board CN54-A5 • AT-49A board CN1-33 • PR-176 board CN1-35
	WHITE BAL selector (on the side panel) : B	4	<div> – SELF DIAG. – STEP 5 SET A/B : OK PUSH AWB. SW. </div>	<ul style="list-style-type: none"> • SW-220 board S4 • MB-317AP board CN54-A4 • AT-49A board CN1-30
	WHITE BAL selector (on the side panel) : PRST	4	<div> – SELF DIAG. – STEP 5 SET W. PST : OK PUSH AWB. SW. </div>	<ul style="list-style-type: none"> • SW-220 board S4 • MB-317AP board CN54-B4 • AT-49A board CN1-31

(2) VTR system

If a result of the diagnostic is different from one in the following table, check the circuit as the following procedure.

1. Install the EX-148 extension board in place of the SY-117CP board. (Never connect the SY-117CP board.)
2. Short between TP5/EX-148 board and TP1(GND)/EX-148 board with a shorting clip.
3. Check whether the signal described in the following table is appeared or not at TP6 and TP7 by shorting between TP8, TP9, TP10 and TP1(GND).
 TP6: IC202-14/MB-317AP
 TP7: IC201-14/MB-317AP

○: Short to TP1

TP8	TP9	TP10	TP6	MODE	TP7	MODE
○	○	○	METAL / OXIDE	7	H: CASSE IN	6
○	○		H: OX REC OK	7	H: METAL REC OK	7
○		○	L: RETURN KEY	5	L: CASSE LOCK	6
○			(VTR STBY / SAVE SW)		(L: TC READY)	
	○	○	(H: RFALARM)		(L: CAM READY)	
	○		L: EJECT KEY	5	(L: SV READY)	
		○	L: FF KEY	5	L: STOP KEY	5
			L: REW KEY	5	L: PLAY KEY	5

4. When the signal is appeared as described in the above table, the SY-117CP board has a trouble.

When the signal is not appeared as described in the table, check a related circuits as following procedure.

- (1) Remove the all plug in printed circuit boards including the CD-89 board.
 Then install the EX-148 extension board in the position of the SY-117CP board.
- (2) Short between TP5/EX-148 board and TP1(GND)/EX-148 board, TP50(+5V)/EX-148 board and TP508/TC-48AP board with shorting clips. Make sure that the SL10/TC-48AP board is shorted, SL11 is opened.
- (3) Install the Battery or use the AC adaptor. Turn OFF the POWER switch.
- (4) Check a related circuit.


(NOTE) • Within a few seconds, check a relate circuit.
 • After the check is completed, remove the shorting clips rapidly.

The circuit is normal when measuring as following.

- Photo interrupter (Ref. No. PD)
 H : more than 0.6 V at collector
 L : less than 0.3 V at collector

- Transistor
 H : more than 4 V at collector
 L : 0 V at collector

• VTR System-1

Procedure	LCD display	VF screen	Related circuit
Press the ADVANCE button so that the MODE "5" is displayed.		VTR DIAG MODE-1 FUNCTION KEY/LAMP CHECK	
Press the SHIFT button.	5	PUSH FF KEY	
Press the F FWD button.	5	<div>PUSH FF KEY OK</div> <div>↓</div> <div>PUSH REW KEY</div>	S2, CN1-6/KY-124→CN59-6/MB-317AP →IC202-7/MB-317AP
Press the REW button.	5	<div>PUSH REW KEY OK</div> <div>↓</div> <div>PUSH PLAY KEY</div>	S4, CN1-4/KY-124→CN59-4/MB-317AP →IC202-9/MB-317AP

(NOTE) If "OK" is displayed without pressing the appointed button, check a related circuit.

Procedure	LCD display	VF screen	Related circuit
Press the PLAY button.	5	<div>PUSH PLAY KEY OK</div> <div>PUSH STOP KEY</div>	S3, CN1-3/KY-124→CN59-3/MB-317AP →IC201-9/MB-317AP
Press the STOP button.	5	<div>PUSH STOP KEY OK</div> <div>PUSH EJECT KEY</div>	S1, CN1-7/KY-124→CN59-7/MB-317AP →IC201-7/MB-317AP
Press the EJECT button.	5	<div>PUSH EJECT KEY OK</div> <div>PUSH START KEY</div>	S5, CN1-5/KY-124→CN59-5/MB-317AP →IC202-6/MB-317AP

Procedure	LCD display	VF screen	Related circuit
Press the START button.	5	<div>PUSH START KEY OK</div> <div>PUSH RETURN KEY</div>	Connect the SY-117CP board to the EX-148 board CN58-A3/MB-317AP→CN1-48/SY-117CP
Press the RETURN button. Check that the following lamps are turned on. <ul style="list-style-type: none"> • REC TALLY (Viewfinder) • BATTERY INDICATOR (Viewfinder) • TALLY • PLAY • F FWD • REW • WARNING 	5	<div>PUSH RETURN KEY OK</div> <div>FUNCTION LAMP ALL ON PUSH ADVANCE</div>	CN58-B3/MB-317AP→IC202-3/MB-317AP Check for continuity <ul style="list-style-type: none"> • PLAY lamp IC1-3/AU-97P→CN10-12/MB-317AP →CN59-10/MB-317AP→CN1-10/KY-124 • F FWD lamp IC1-1/AU-97P→CN10-14/MB-317AP →CN59-8/MB-317AP→CN1-8/KY-124 • REW lamp IC1-2/AU-97P→CN10-13/MB-317AP →CN59-9/MB-317AP→CN1-9/KY-124

Table-1

POSITION	C-IN SW	C-LCK SW	MODE	CODE
1	O	O	BO	0001
2	O	O	EJECT	0011
3	O	O	B1	0010
4	O	L	STBY	0110
5	O	L	B2	0111
6	O	L	LOAD	0101
7	I	L	B3	0100
8	I	L	FF/REW	1100
9	I	L	B4	1101
A	I	L	STOP	1111
B	I	L	B5	1110
C	I	L	FWD	1010
D	I	L	B6	1011
E	I	L	REV	1001
F	I	L	B7	1000

- [C-IN SW] O:OUT I:IN

When the cassette is not inserted, "0" is always displayed.

- [C-LCK SW] O:OPEN L:LOCK


- [CODE]

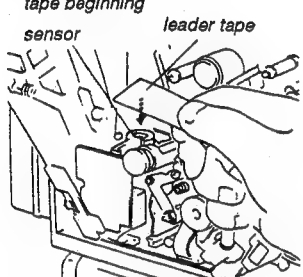
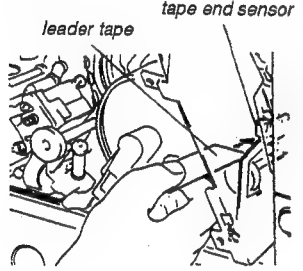
Remove the mechanical deck block and extend it by the Extension Harness which is prepared for service.

BIT-3 (4)/SR-40→CN1-8/TB-5→CN44-8/MB-317AP→CN1-36/SY-117CP
 BIT-2 (3)/SR-40→CN1-9/TB-5→CN44-9/MB-317AP→CN1-37/SY-117CP
 BIT-1 (2)/SR-40→CN1-10/TB-5→CN44-10/MB-317AP→CN1-38/SY-117CP
 BIT-0 (1)/SR-40→CN1-11/TB-5→CN44-11/MB-317AP→CN1-39/SY-117CP

• VTR system-3


This mode should be performed after setting POSITION to "8" in MODE "6".


Procedure	LCD display	VF screen	Related circuit
Press the ADVANCE button so that the MODE "7" is displayed.		VTR DIAG MODE-3 PHOTO INT. CHECK-2	
Press the SHIFT button.	7	PUSH SENS SW M/O M M-REC D O-REC D NEXT-PLAY	
Press the METAL/OXIDE switch. (This switch detects an oxide and "0" is displayed.)	7	PUSH SENS SW M/O 0 M-REC D O-REC D NEXT-PLAY	PD33-3/MB-317AP→Q33-C/MB-317AP →IC202-1/MB-317AP
Press the METAL MISS REC switch. ("E" of enable is displayed.)	7	PUSH SENS SW M/O M M-REC E O-REC D NEXT-PLAY	PD32-3/MB-317AP→Q32-C/MB-317AP →IC201-2/MB-317AP
Press the OXIDE MISS REC switch. ("E" of enable is displayed.)	7	PUSH SENS SW M/O M M-REC D O-REC E NEXT-PLAY	PD35-3/MB-317AP→Q35-C/MB-317AP →IC202-2/MB-317AP
Press the PLAY BUTTON.	7	TAPE TOP/END CHECK TOP	

Procedure	LCD display	VF screen	Related circuit
<p>Close the leader tape such as a piece of aluminium with the tape beginning sensor. (The tape beginning is detected and "DET" is displayed on the VF screen.)</p> <p>tape beginning sensor leader tape</p> 	7	<div>TAPE TOP/END CHECK TOP DET</div> <div>↓</div> <div>TAPE TOP/END CHECK TOP DET END</div>	<p>Short between TP47/EX-148 board and TP50 (+5V) /EX-148 board with a shorting clip. After making sure that the CN in the parentheses is "H", check the following points.</p> <p>Normally, the points are "H", when closing the leader tape, the points are "L".</p> <p>IC1-3/FE-4(IC1-1 "H")</p> <p>CN43-4/MB-317AP (CN43-5 "H")</p> <p>CN1-46/SY-117CP(CN1-47 "H")</p>
<p>Close the leader tape such as a piece of aluminium with the tape end sensor. (The tape end is detected and "DET" is displayed on the VF screen.)</p> <p>leader tape tape end sensor</p> 	7	<div>TAPE TOP/END CHECK TOP DET END DET</div> <div>TAPE TOP/END CHECK TOP DET END DET PUSH ADVANCE</div>	<p>Short between TP47/EX-148 board and TP1 (GND) /EX-148 board with a shorting clip. After making sure that the CN is the parentheses is "H", check the following points.</p> <p>Normally the points are "H", when closing the leader tape, the points are "L".</p> <p>IC1-3/FE-4(IC1-1 "H")</p> <p>CN43-4/MB-317AP(CN43-5 "L")</p> <p>CN1-46/SY-117CP(CN1-47 "L")</p>

- VTR system-4

This mode should be performed after setting POSITION to "8" in MODE "6".

Procedure	LCD display	VF screen	Related circuit
Press the ADVANCE button so that the MODE "8" is displayed.		VTR DIAG MODE-4 DRUM/CAP MOTOR ON	
Press the SHIFT button.	8	<div>DRUM ON OK</div> <div>↓</div> <div>DRUM ON OK NEXT-PLAY</div>	<ul style="list-style-type: none"> When "NG" is displayed. Refer to fig. 1. (Page. 1-31)
Press the PLAY button.	8	<div>CAP F-ON T-RL FG</div> <div>↓</div> <div> CAP F-ON OK T-RL FG OK NEXT-PLAY </div>	<p>When "NG" is displayed.</p> <ul style="list-style-type: none"> CAP F-ON Refer to fig. 2. (Page. 1-32) T-RL FG PD37-4/MB-317AP→Q37-C/MB-317AP →CN1-3/SY-117CP

Procedure	LCD display	VF screen	Related circuit
Press the PLAY button.	8	<div>CAP R-ON S-RL FG</div> <div>CAP R-ON OK S-RL FG OK PUSH ADVANCE</div>	<p>When "NG" is displayed.</p> <ul style="list-style-type: none"> • CAP R-ON Refer to fig. 2. (Page. 1-32) • S-RL FG PD36-4/MB-317AP→Q36-C/MB-317AP →CN1-4/SY-117CP
Press the ADVANCE button and the MODE "0" is displayed.		<div>HOURS METER DISPLAY</div>	

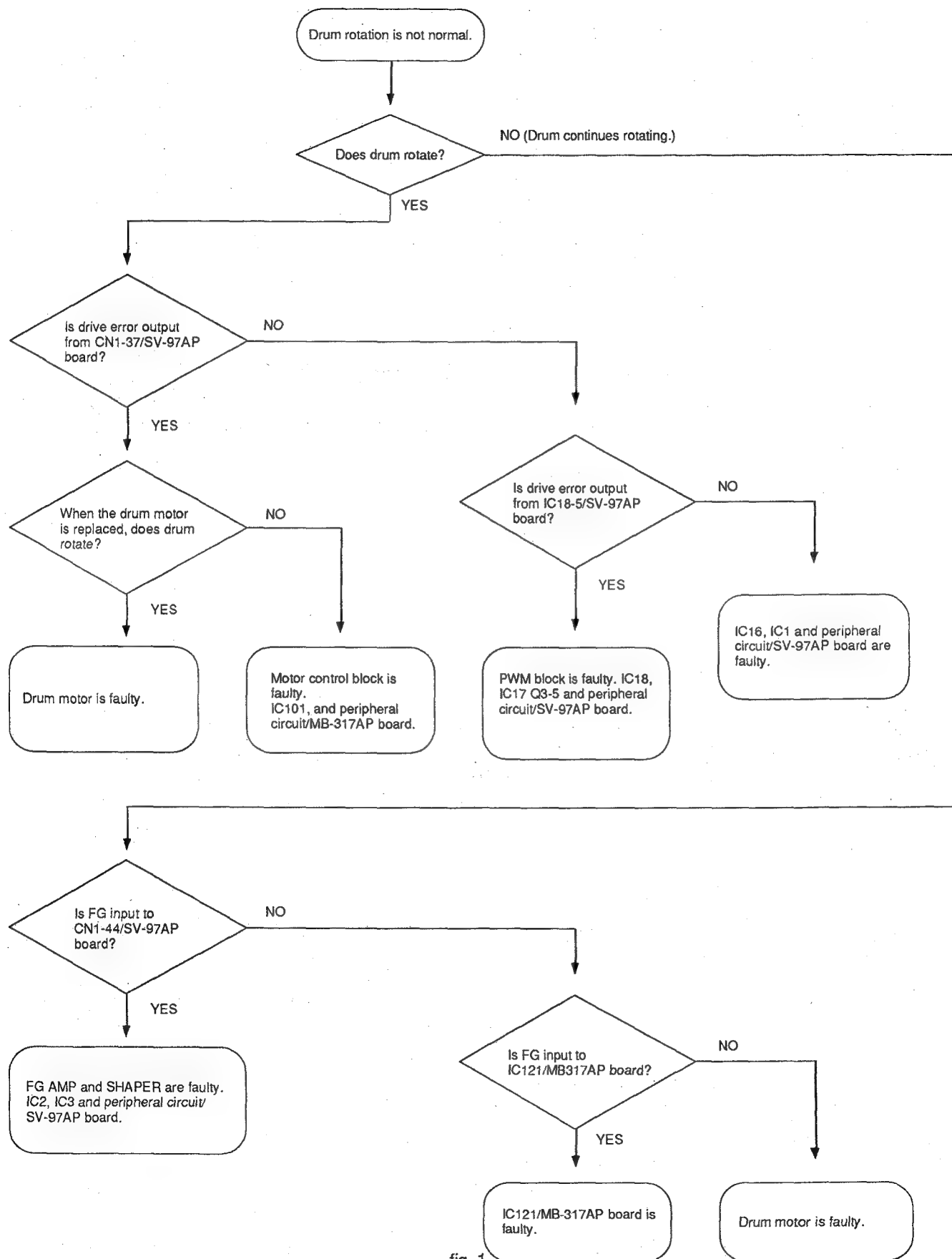
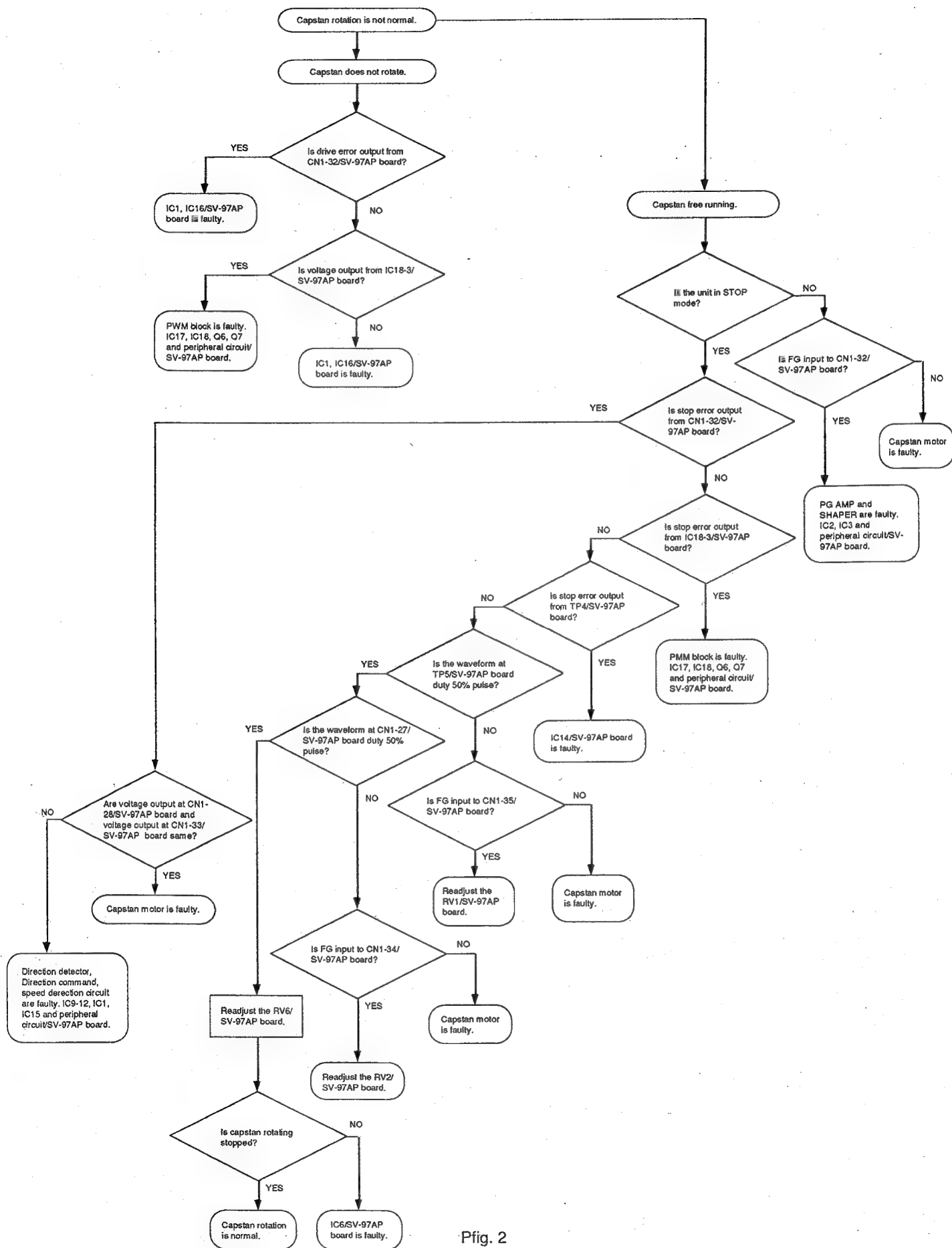


fig. 1

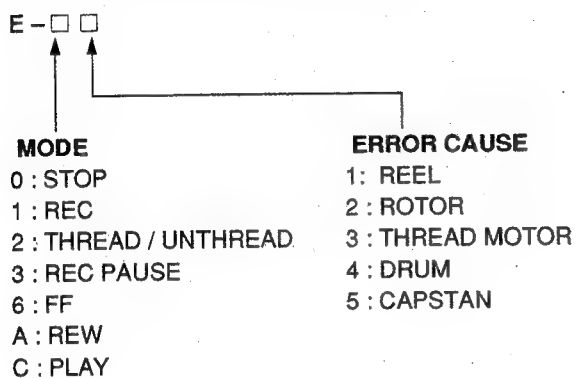


Pfig. 2

1-8. ERROR INFORMATION

1-8-1. Error Code Display

When the tape is slackened in the unit, its error cause and its error mode are displayed on the LCD Display.



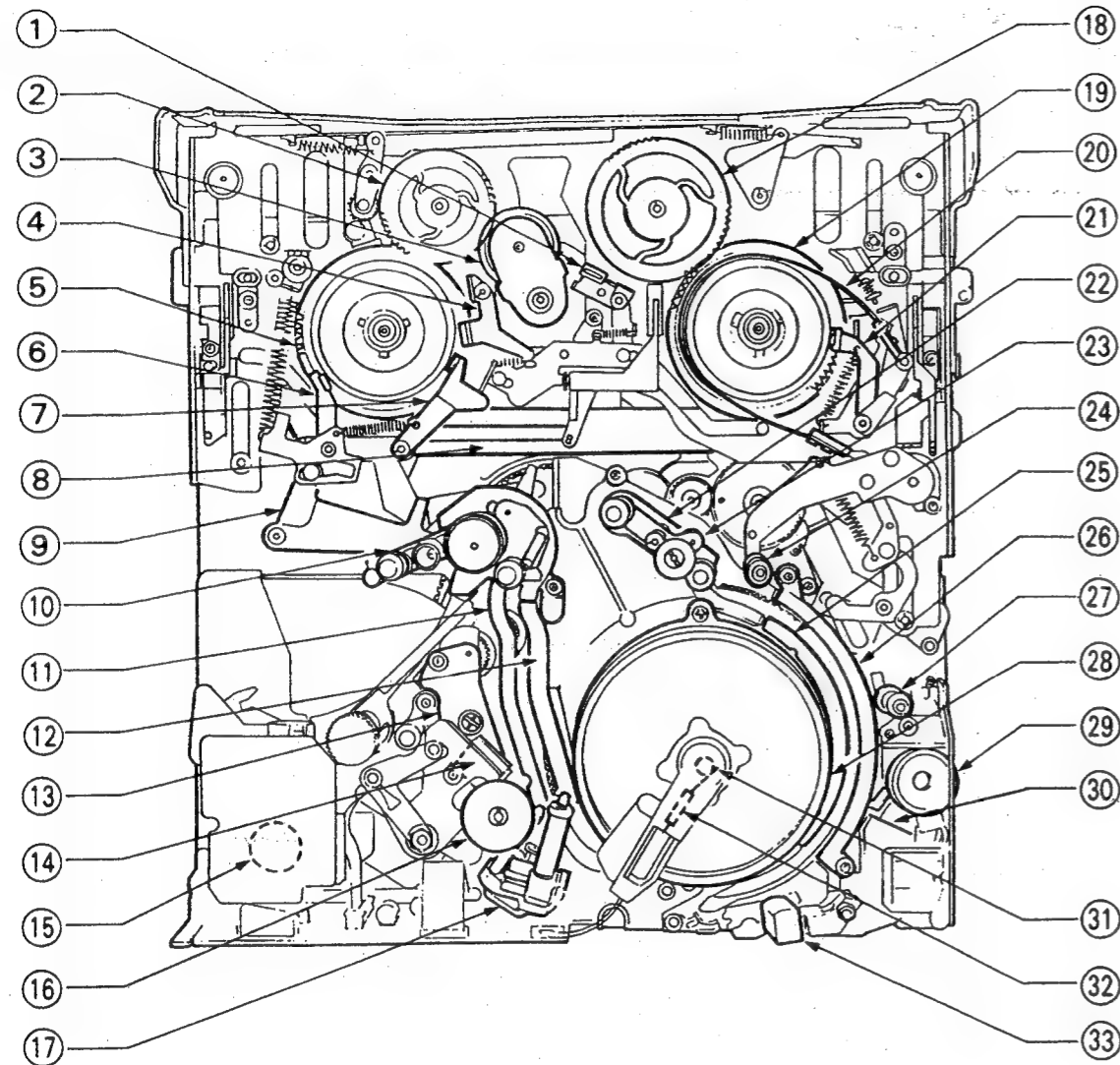
1-8-2. Error Information

If errors are detected when the power is turned on, the following warnings will be displayed.

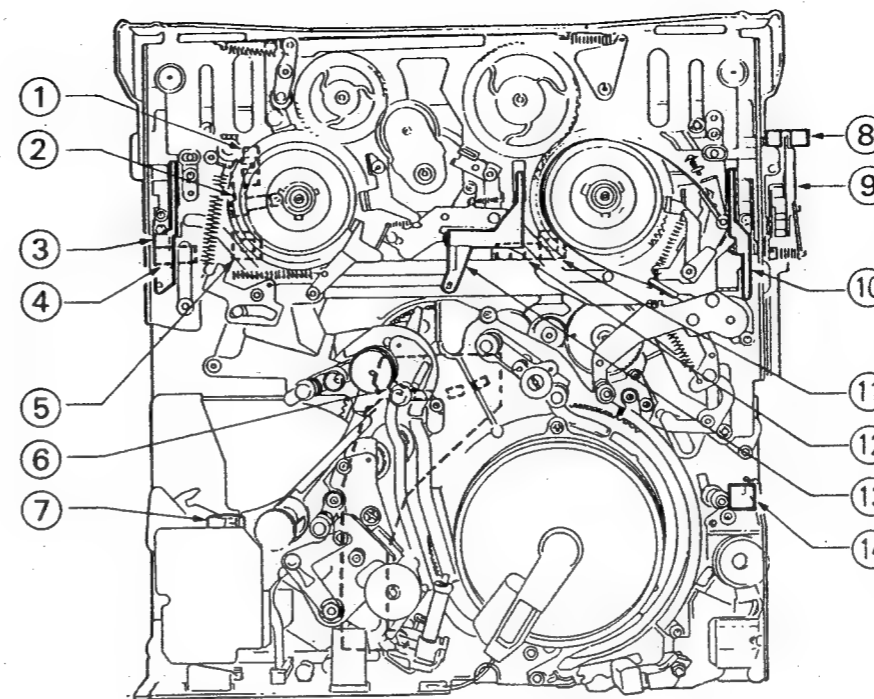
Warning	Problem	Correction
Warning lamp lights up. Alarm sounds continuously. "SERVO" is displayed on the LCD. REC tally lamp blinks at a 4 Hz period.	An error was detected in the communication between the system controller CPU and servo MPU when the power was turned on.	Check the communication path between the SY board and SV board. The boards may have been disconnected, etc.
WARNING lamp blinks at a 2 Hz period.	An error was detected in the communication between the system controller CPU and TC MPU when the power was turned on.	Check the communication path between the SY board and TC board. The boards may have been disconnected, etc.
"EE-00" is displayed for 20 sec. at the TIME CODE part of the LCD.	An error was detected in the communication between the TC MPU and NOVRAM when the power was turned on.	Check the communication path between the MPU and NOVRAM on the TC board. The NOVRAM (IC515) may have been miss inserted, etc.

1-9. LOCATION OF MAIN PARTS

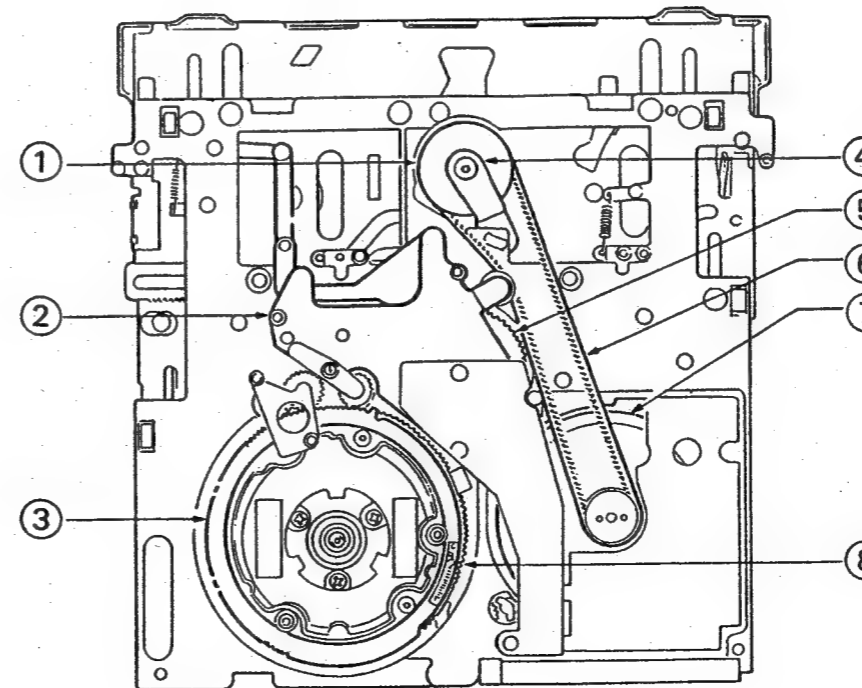
1-9-1. Location of the Mechanical Main Parts / Components



- | | | | |
|-------------------------------|---------------------------|---------------------------|--------------|
| 1 Supply Side Main Brake | 11 Take-up Side Rail (O) | 21 Supply Side Soft Brake | 31 Slip Ring |
| 2 Take-up Side Idler | 12 Take-up Side Rail (I) | 22 Supply Side Base | 32 Brush |
| 3 Gear | 13 Threading Gear | 23 Supply Side Sub-base | 33 CTL Head |
| 4 Take-up Side Main Brake | 14 Audio/TC Confi Head | 24 Tension Regulator | |
| 5 Take-up Side Reel Table | 15 Threading Motor | 25 Supply Side Rail (O) | |
| 6 Take-up Side Sub Soft Brake | 16 IR-3 | 26 Supply Side Rail (I) | |
| 7 Take-up Side Soft Brake | 17 Take-up Side Sub-base | 27 TG-1 | |
| 8 Reel Slider | 18 Supply Side Idler | 28 Drum | |
| 9 Main Pinch Arm | 19 Supply Side Reel Table | 29 IR-1 | |
| 10 Sub-pinch Arm | 20 Tension Regulator Band | 30 Full Erase Head | |



- | | |
|--------------------------------------|---------------------------------------|
| 1 Cassette Detection Sensor | 8 Cassette-up Compartment Lock Sensor |
| 2 Cassette Detection Shutter | 9 Lock Arm |
| 3 Miss-REC Lever A | 10 Miss-REC Lever B |
| 4 Miss-REC Sensor | 11 Supply Reel Rotation Detector |
| 5 Take-up Reel Rotation Detector | 12 Metal/Oxide Selector |
| 6 Mechanical Function Control Sensor | 13 Metal Detection Lever |
| 7 Tape Beginning Sensor | 14 Tape End Sensor |

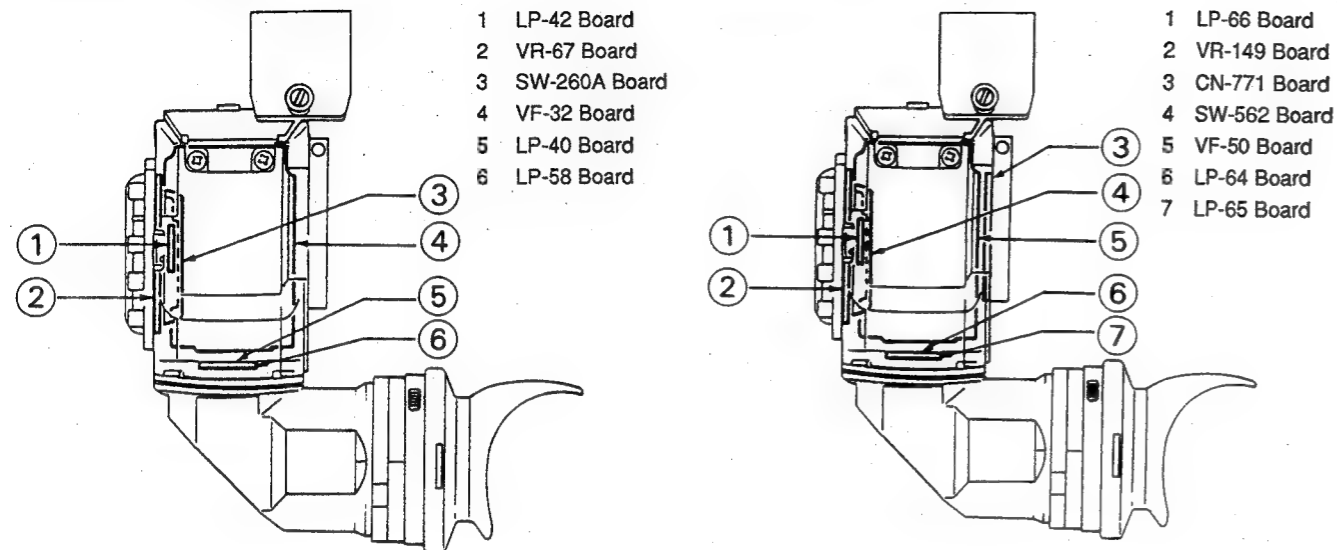


- | | |
|--------------------|--------------------|
| 1 Relay Pulley | 4 Gear Base |
| 2 Cam Gear Base | 5 Function Cam |
| 3 Threading Ring T | 6 Timing Belt |
| | 7 Capstan |
| | 8 Threading Ring S |

1-9-2. Location of the Printed Circuit Boards

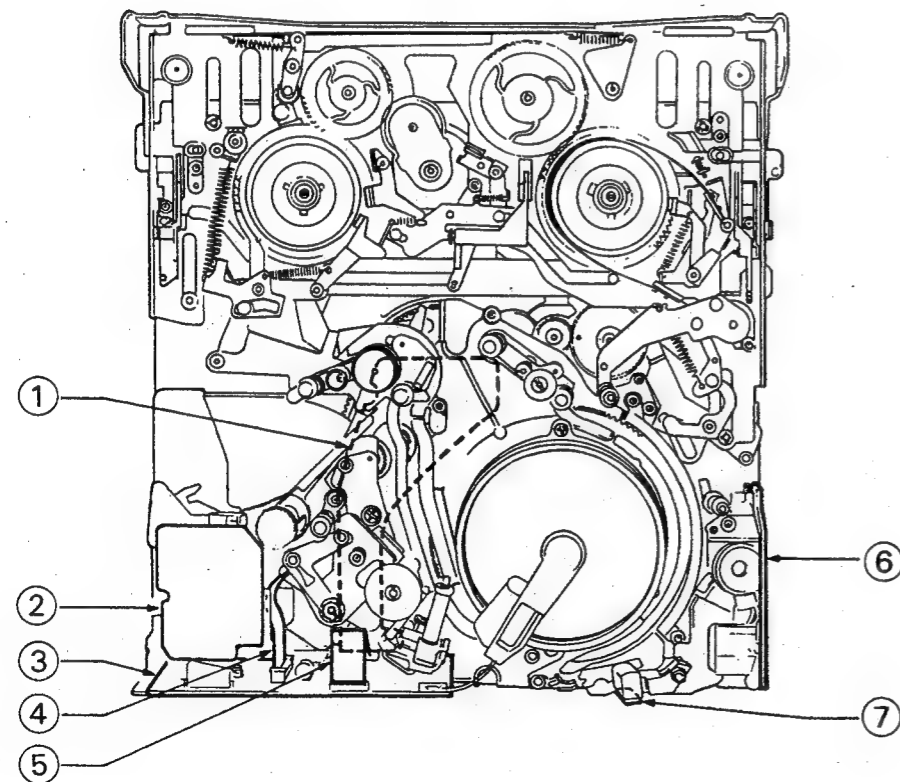
S/N; 41954 through 43999

S/N; 44001 and higher

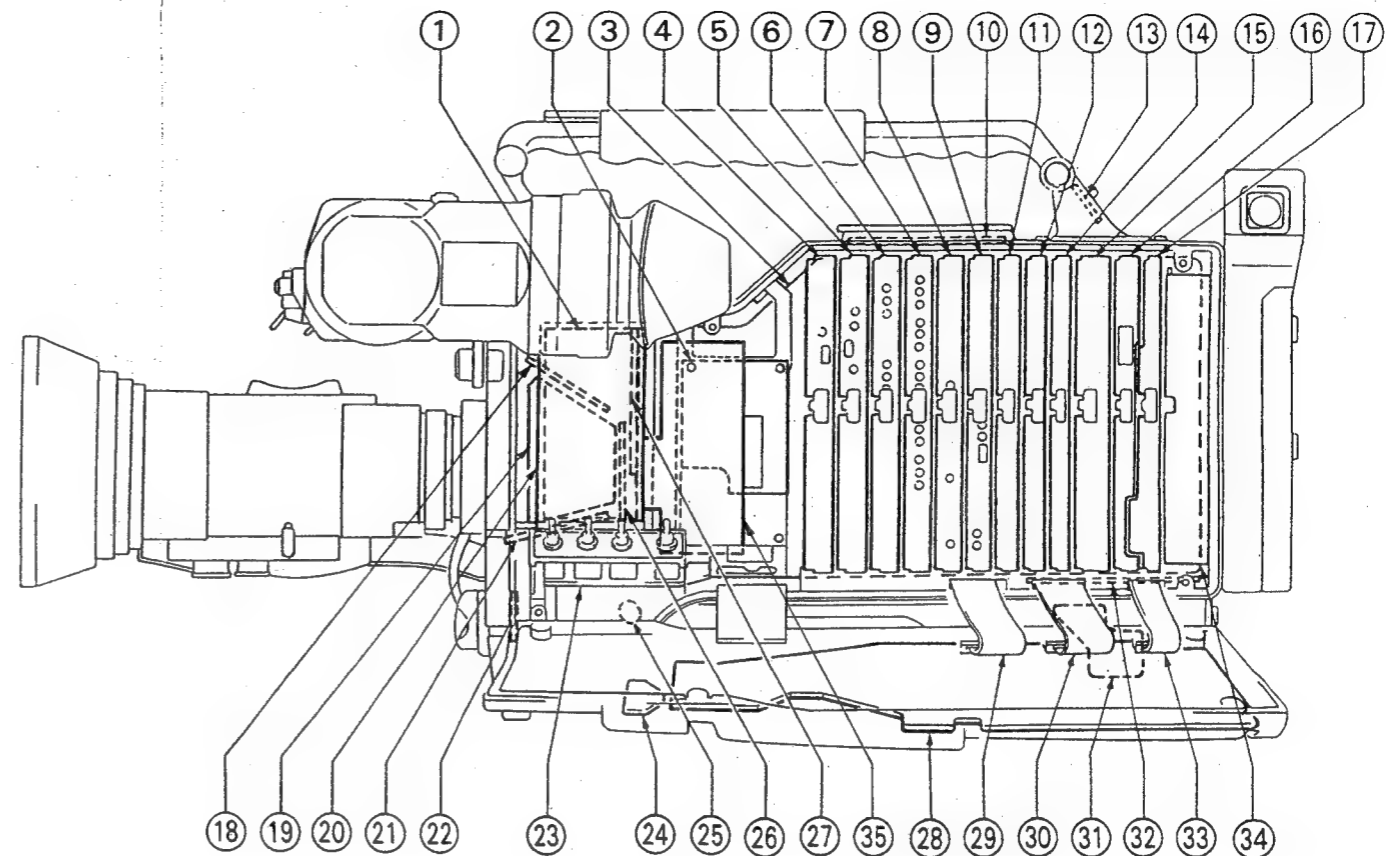


- 1 LP-42 Board
- 2 VR-67 Board
- 3 SW-260A Board
- 4 VF-32 Board
- 5 LP-40 Board
- 6 LP-58 Board

- 1 LP-66 Board
- 2 VR-149 Board
- 3 CN-771 Board
- 4 SW-562 Board
- 5 VF-50 Board
- 6 LP-64 Board
- 7 LP-65 Board



- 1 SR-40 Board
- 2 LD-21 Board
- 3 TB-5 Board
- 4 FL-55P Board
- 5 FL-53 Board
- 6 FE-4 Board
- 7 DUS-246 Board



- | | | |
|--------------------|-------------------|--------------------------|
| 1 PA-101/155 Board | 13 SW-291 Board | 25 VR-77 Board |
| 2 IF-298 Board | 14 AFM-6P Board | 26 BI-22 Board |
| 3 MB-317AP Board | 15 AU-97P Board | 27 TG-57P/162P Board |
| 4 AT-49A Board | 16 SV-97AP Board | 28 TC-48AP Board |
| 5 IE-30AP Board | 17 SY-117CP Board | 29 FL-45 Board |
| 6 VA-83/168 Board | 18 BI-24 Board | 30 FL-46 Board |
| 7 PR-176 Board | 19 CN-273 Board | 31 CN-400 Board |
| 8 EN-79P Board | 20 DR-84 Board | 32 PS-162 Board |
| 9 SG-152P Board | 21 BI-23 Board | 33 FL-57 Board |
| 10 KY-124 Board | 22 SW-357B Board | 34 CD-89 DC-DC CONVERTER |
| 11 VP-24P Board | 23 SW-220 Board | 35 TG-163 Board |
| 12 VDA-11P Board | 24 VR-70 Board | |

1-10. PRINTED CIRCUIT BOARDS

SYSTEM	CIRCUIT BOARD	CIRCUIT FUNCTION
CAMERA	CN-273	Connector PCB for BI-22, 23, and 24
	BI-22 BI-23 BI-24	CCD mount
	*3 TG-57P TG-162P TG-163 TG-121	Timing Generator
	*3 PA-101 PA-155	Pre-amp (Sample & Hold)
	DR-84	CCD Driver
	*3 VA-83 VA-168	Video Amp, Black Set, Total Gain Change, Shading Compensator
	IE-30AP	Image Enhancer
	IE-31	Aperture
	PR-176 PR-177 PR-178	Gamma, Masking, Knee, Slope, W. Clip, Dynamic Contrast Control
	EN-79P	Y/R-Y/B-Y Signal Generator for VTR, Encoder, Color Bars Generator
	SG-152P	Sync Generator, Genlock
	SG-157P	Sub-regulator
	AT-49A	Auto White/black Function, VF Character Generator, System Controller, Audio Level Detector
	SW-220	SAVE-STBY, Color Bars ON/OFF, DCC ON/OFF, Memory A/B/Preset SW
	SW-357B	Auto White/Black SW VTR Start/Stop SW Shutter ON/OFF Select
	VR-77	Master Black VR
	IF-298AP	26P Interface, Logic, VF Marker Gen.

SYSTEM	CIRCUIT BOARD	CIRCUIT FUNCTION
VIDEO	VDA-11P	CTDM and C-Modulator
	AFM-6P	Y-Modulator, AFM
	VP-24P	Video Playback, Head Select Pulse Generator
AUDIO	AU-97P	Audio REC/PB Processor
	TB-5	Terminal Board, Audio Confi PB
	FL-55P	Audio Head AMP, Relay Board for TB and A/T Head
SERVO	SV-97AP	Drum/Capstan Servo
SYSTEM CONTROL	SY-117CP	System Control
	KY-124	Function Key Board
TIME CODE	*1 TC-48AP TC-48BP	Time Code Generator, Audio Level Control, Audio Monitor AMP, SW and Indicator for Audio and TC
	VR-70	Volume
POWER	*1 PS-162 PS-162B	Power Distributor
SENSOR	FE-4	Full Erase, Dew and End Sensor
	LD-21	Loading Motor Driver and END Sensor
	SR-40	Mechanical Position Sensor

BOARD CHANGE INFORMATION

OLD NAME	→ NEW NAME	SERIAL NUMBER
*1 PS-162 TC-48AP	→ PS-162B TC-48BP	42096 and higher
*2 SW-291	→ SW-291A	42131 and higher
*3 TG-57P PA-101 VA-83 AT-49A	→ TG-162P, 163 and 121 PA-155 VA-168 AT-49C	44001 and higher
*4 VIEWFINDER VF-32 LP-58 LP-40 LP-42 VR-67 SW-260A	→ VF-50 LP-64 LP-65 LP-66 VR-149 SW-562 CN-771 (added)	

SYSTEM	CIRCUIT BOARD	CIRCUIT FUNCTION
OTHERS	MB-317AP	Mother Board
	*2 SW-291 SW-291A	Back Tally
	FL-45	Relay Board for MB and TC
	FL-46	Relay Board for MB and TC
	FL-53	Relay Board for TB and SR
	FL-57	Relay Board for PS and TC
	EX-148	Extension Board

SYSTEM	CIRCUIT BOARD	CIRCUIT FUNCTION
*4 VIEW-FINDER	VF-32	Drive and Video Amp for Viewfinder, Peaking Signal Generator
	LP-40	REC LED
	LP-42	Front Tally LED
	LP-58	BATT/VTR SAVE LED
	VR-67	Contrast, Bright, Peaking, Audio Level (CH-1) VR
	SW-260A	Tally ON/OFF, Audio Level Indicator ON/OFF, Zebra/Marker ON/OFF SW

SYSTEM	CIRCUIT BOARD	CIRCUIT FUNCTION
*4 VIEW-FINDER	VF-50	Drive and Video Amp for Viewfinder, Peaking Signal Generator
	LP-64	REC LED
	LP-65	BATT/TALLY, VTR SAVE LED
	LP-66	Front Tally LED
	VR-149	Contrast, Bright, Peaking, Audio Level (CH-1) VR
	SW-562	Tally ON/OFF, Audio Level Indicator ON/OFF, Zebra/Marker ON/OFF SW
	CN-771	Connector for VF Cable

1-11. CIRCUIT DESCRIPTION

1-11-1. Camera System Circuit

(1) CCD CONTROL SYSTEM (TG-57P/162P, DR-84, BI-22, 23, 24 and PA-101/155 Boards)

- TG-57P/162P Board

It sends the pulse for driving the CCD to DR-84 boards and the pulse for sampling the video signal output from the CCD to PA-101/155 board. Driving pulse synchronizes with the synchronizing signal sent from SG-152 board.

14.32 MHz counted down from 28.64 MHz is also supplied to SG-152P board.

- DR-84 Board

It converts the driving pulse sent from TG-57P/162P board so as to drive the CCD directly. Converted pulse is sent to BI-22, 23, 24 board and transmitted to the CCD.

The regulator circuit generates +29V by +15V.

- BI-22, 23, 24 Boards

CCD is mounted on this board. Driving pulse and DC control voltage are OUTPUT to the CCD.

The video signal output from the CCD is sent through the emitter follower to PA-101/155 board.

- PA-101/155 Board

It eliminates pulse component of the video signal sent from BI-22, 23, 24 boards. Then the signal processings such as the black level fixing, phase offset adjustment for resolution improvement and amplification by preamplifier are performed on the board, then the video signal is sent to VA-83/168 board.

(2) VIDEO SIGNAL SYSTEM (VA-83/168, IE-30AP, PR-176 and EN-79P Boards)

- VA-83/168 Board

It amplifies the video signal sent from PA-101/155 board and processes the black shading correction, gain-up control, blanking cleaning and white shading correction. It also selects the video signal or TEST SAW signal.

- IE-30AP Board

It generates the detail signal obtained from G and R video signals so as to improve resolution. The detail signal is sent to PR-176 board, then added to R, G and B video signals. G video signal is delayed by 1H, then sent to PR-176 board.

- PR-176 Board

The masking signal and detail signal are added to R, G and B video signals respectively and the flare compensation, pedestal control, knee correction, white clipping and gamma correction are performed on the board.

Then the video signal is sent to EN-79P board.

- EN-79P Board

It generates the luminance (Y) signal, color difference (R-Y, B-Y) signals and composite video (VBS) signal obtained from R, G and B video signals. It also supplies the SMPTE color-bar signals without I, EBU color bar signals.

(3) POWER SUPPLY SYSTEM (CD-89 DC-DC converter)

- CD-89

CD-89 switching regulator generates the voltages of +9.0 Vdc and -9.0 Vdc, +5 Vdc and -5 Vdc and SW'D +6V for the respective boards from the externally supplied unregulated DC power.

It also supplies voltages for the viewfinder (+9.3V) and for CCD control (+15V, +7V) and for microphone (+48V).

SW'D +6V, +20V, +6.5V and +48V are ON or OFF by the system control signal according to various modes respectively.

(4) SYNCHRONIZING SIGNAL SYSTEM (SG-152P Board)

- SG-152P Board

It generates various synchronizing signals.

It detects the external genlock signal automatically and synchronizes with it.

Then, it contains the auto iris circuit that controls the iris by detecting the video signal level at any time, the regulator circuit generates +8.5V, +4.6V, -4.5V sent the video signal system, and the regulator circuit generates +4.7V for the CCD control system by +9V, +5V, -5V supplied from CD-89.

(5) AUTOMATIC CONTROL SYSTEM (AT-49A Board)

- AT-49A Board

Microcomputer unit on the AT-49A board sends to the control signal and compensation signal to appropriate boards in accordance with the selection of function switches.

It also detects the position of color temperature conversion filter, pedestal control and video level automatically, then compensates the video signals and displays various warnings.

Besides it contains the interface circuit with remote control unit RM-P3 (optional) and the level detection circuit to display the audio level.

(6) INTERFACE SYSTEM (IF-298AP Board)

- IF-298AP board

The IF-298AP board mainly consists of three blocks: the 26-pin interface block, logic block for external VTR REC START/STOP control, and VF MARKER GEN. block.

1-12. FUNCTION OF THE SENSORS

- (1) Miss-REC Switch (for metal particle tape)
This is a record-proof switch for metal particle tape.
- (2) Miss-REC Switch (for oxide tape)
This is a record-proof switch for oxide tape.
- (3) Oxide/Metal Particle Tape Detection Switch
This switch detects whether an oxide tape or a metal particle tape is being used.
- (4) Cassette-in Switch
This switch detects whether a cassette is being inserted.
- (5) Cassette-up Compartment Lock Switch
This switch detects that the Cassette-up Compartment is locked.
When the Cassette-up Compartment is locked, threading is performed.
When EJECT mode, the Cassette-up Compartment is opened, the EJECT mode is finished.
- (6) Cam Position Sensor
This sensor detects whether the Cam is moved to the designed position or not.
- (7) Temperature Detection Sensor
This sensor detects the temperature and then Black correction is performed.

1-13. USE UNDER SPECIAL ENVIRONMENT (MEASURE FOR COLD AREA)

The BVW-300AP is guaranteed its operation under the temperature of 0°C to 40°C.
When the unit is used under 0°C, cover-cloth against the cold (LKW-200) is recommended.

1-14. VOLTAGE CHANGING OF BATTERY BEFORE END

Voltage of battery before end can be changed by the following procedures described below.

Setting available range : 11.0 V to 13.0 V

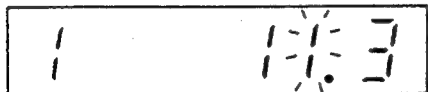
Setting available minimum unit : 0.1 V

When the unit is shipped, this is set to 11.30V.

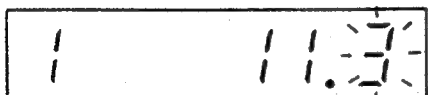
1. Press the DIAGNOSTIC switch on the side panel, and put into the DIAGNOSTIC mode.
(Refer to Sec.1-7)
2. Press the ADVANCE button on the side panel, so that set the MODE "1".
Then, the voltage of battery before end is displayed on the LCD-display.



3. Press the SHIFT button on the side panel so that blinking the first digit.



4. Set the desired figure pressing the ADVANCE button.
5. Press the SHIFT button so that blinking the decimal digit.



6. Set the desired figure pressing the ADVANCE button.
7. Press the SHIFT button. Then the desired voltage is stored in the ROM.
If the value is stored in the ROM, "O" is displayed automatically.



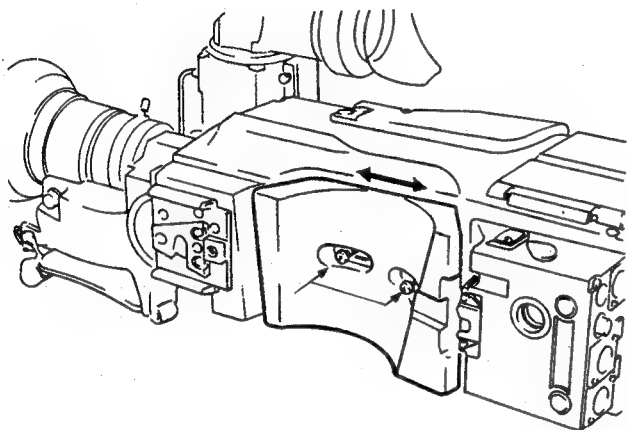
If the value can be not stored in the ROM because of the error, display the following.



In this case, press the ADVANCE button and then repeat the above procedures.

1-15. RELOCATING THE SHOULDER PAD

Loosen the two fixing screws in the figure and relocate the shoulder pad to the desired position. Then tighten the screws. Can be moved ± 10 mm back and forth



1-16. REMOTE CONTROL OF THE CAMERA SYSTEM

The camera system of the BVW-300AP can be remote controlled with the remote control unit RM-P3 (optional). Connect the RM-P3 with REMOTE connector of the BVW-300AP by a cable. The remote cable can extend a maximum of 100m.

When RM-P3 is disconnected from the unit with turning ON the POWER switch, the unit maintains the REMOTE mode. Therefore, the GAIN selector and so on of the unit are not functioned.

Turn OFF the POWER switch, and turn ON again, the REMOTE mode is released.

In this case, MASTER PED and WHITE BAL data and so on are not remained setting by the RM-P3.

1-17. SUPPLIED ACCESSORIES

Supplied BVW-300AP accessories are as follows.

- (1) Shoulder strap
 - (2) Extension board (EX-148)
 - (3) Rain cover
 - (4) Tripod adaptor (VCT-14)
 - (5) Microphone
 - (6) Carrying case (LC-201)
 - (7) Operation manual.
- Maintenance manual vol-1, vol-2

1-18. OPTIONAL ACCESSORIES

The followings are the accessories. Use the suitable accessory according to the need.

- AC Power Adaptor : AC-500CE

The VTR can be driven by an AC power source from the AC adaptor, AC-500CE. The AC-500CE is worldwide type of adaptor. AC-500 can be used with 100 / 120 / 220 / 240V commercial power supplies just by setting the voltage selector to the appropriate position for a stable supply of DC power.

- Remote Control Unit : RM-P3

The camera system of the BVW-300AP can be remote controlled by connecting a REMOTE connector of the BVW-300AP to a REMOTE connector of the RM-P3 with a cable. The remote cable can extend a maximum of 100m.

- Battery Pack : NP-1B, NP-1A, BP-90A, BP-90

They are the chargeable 12V battery pack. NP-1B's capacity is 2.3 Ah, that of the NP-1A is 1.7 Ah, and that of the BP-90A is 5.0 Ah and that of the BP-90 is 3.5 Ah.

- Battery Charger : BC-1WB, BC-1WA, BC-210

The BC-1WB battery charger is designed to charge NP-1B/1A battery packs. Four NP-1B/1A battery packs can be inserted at one time, and will be charged in sequence automatically.

The BC-210 battery charger is designed to charge BP-90A/90 battery packs. Four BP-90A/90 battery packs can be inserted and charged at one time automatically.

- Battery Adaptor : DC-500, DC-520, DC-210

The battery case, DC-500 is for the battery pack, BP-90A/90, DC-520 can insert the two NP-1B/1A with the standard battery case.

DC-500 can be replaced for the standard battery case supplied the BVW-300AP.

- Wireless Microphone System

UHF portable tuner : WRR-27

UHF portable tuner : WRR-28L

UHF transmitter : WRT-27

The audio sound can be recorded on the tape without wire cable by using these wireless microphone system.

- Playback Adaptor : VA-500CE/510CE

Connect the VA-500CE/510CE with the BVW-300AP, the color playback picture can be obtained. Either the composite signal or the VHF RF signal can be output.

- VF rotate bracket : BKW-401

The BKW-401 is a rotating housing mechanism for the VF of the Betacam camera. The range of rotation is from the horizontal position (operating condition) to 90°. It also provides the front and rear sliding mechanism for the VF.

- VTR connector unit : BKW-402

This kit is used to connect the BVW-300A to the BVW-35P/25P portable video cassette recorder using the CCZ 26-pin cable. This arrangement enables simultaneous recording using the built-in VTR and external VTR by component signal.

- Camera grip : CAC-GR01

When this grip is attached to the camera, you can have functions such as START/STOP recording, REC REVIEW, and ZOOM at your fingertips.

Only the 12-pin connector standard lens can be used.

- 3-inch viewfinder : BVF-3

Please refer to OPERATION MANUAL for more information on installation.

- Earphone : ME-20B

- Microphone : C-74

- Microphone Holder : CAC-12

- Cradle Suspension : CRS-3P

- Carrying Case : LC-201

- UHF portable tuner attachment kit: BTA-27

- Cassette Tape : BCT-5M / 10M / 20M / 30M
BCT-5G / 10G / 20G / 30G

- Portable Videocassette Recorder : BVW-35P, BVW-25P

- BVW-35P/25P Connection Cable : CCRZ-5, CCZ-2/10

- Cleaning Cassette: BCT-5CLN

- FP (fog-proof) Filter

- VF Extended Arm Assy for Left Eye

- Eyepiece Assembly for aged eyes

(-2.8~ + 2.0D)

(Sony Part No. A-8262-537-A)

- Eyepiece Assembly for low power

(-3.6~ + 0.8D)

(Sony Part No. A-8262-538-A)

- Chest Pad

(Sony Part No. A-8262-516-A)

- Lens Assembly

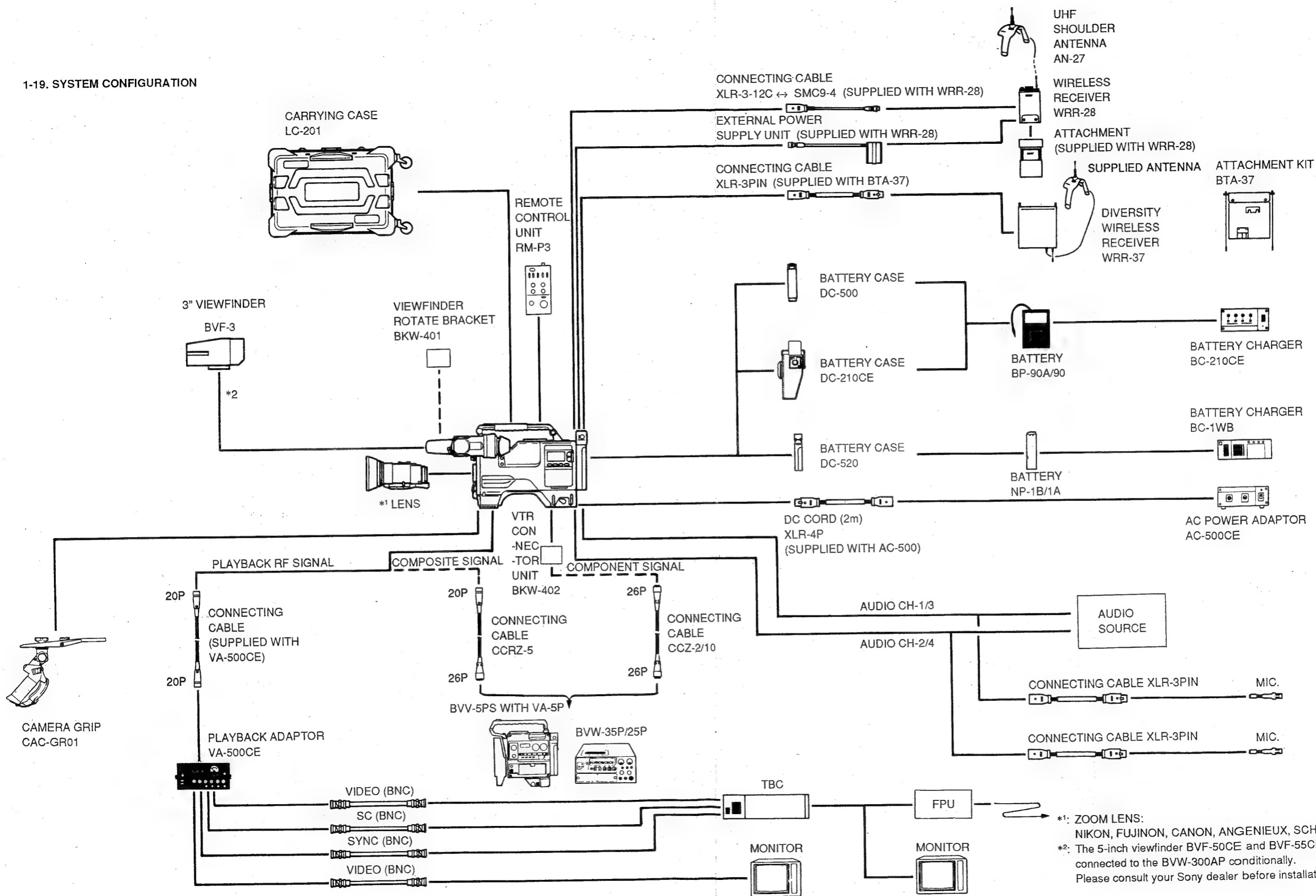
(standard magnification with special compensation for aberration)

(Sony Part No. A-8267-737-A)

- High performance (3x) Lens Assembly

(Sony Part No. A-8314-798-A)

1-19. SYSTEM CONFIGURATION



BVW-300AP (EK)

1-47

1-48

PERIODIC CHECK AND MAINTENANCE

The replacement time shown in the table below is not the gurantee term of parts. Use this table as guideline for maintenance and inspection. The replacement time of parts varies depending on the operating environment and conditions of the unit.

- every 50 hours (A) : Cleaning by cleaning tape (Refer to Section 2-4)

1. Cleaning by cleaning tape (Refer to Section 2-4)
2. Cleaning by cleaning cloth (Refer to Section 2-4)

- Threading motor B 1,500H
- Capstan motor B 1,500H
- Full erase head B 1,500H
- CTL head B 1,500H
- A/T head B 1,000H

2 ♦: Replacement
O: Cleaning

2-2. HOURS METER

BVW-300A has an hours meter in the DIAGNOSTIC mode. It displays the accumulated time of drum rotating time, tape running time, and VTR turning on time on the display on the side panel.

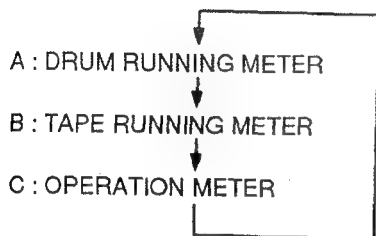
It is recommended to perform the periodic checks and maintenance based on the hours meter.

Hours meter can be displayed by the following procedures described below.

1. Press the DIAGNOSTIC switch on the side panel and put into the DIAGNOSTIC mode.
"DRUM RUNNING METER" is displayed.



2. By pressing the SHIFT button on the side panel, the display rotates in the following sequence.



3. To end the DIAGNOSTIC mode, press the DIAGNOSTIC switch again.

(NOTE) If the TC-48AP board is replaced, be sure to replace the nonvolatile memory (Ref. No. IC515).

2-3. MAINTENANCE AFTER THE REPAIRS

Perform the following maintenance after repair without regarding the machine operating hours.

1. Video heads and stationary heads cleaning.
2. Tape movement area cleaning.

2-4. CLEANING PROCEDURE

[Cleaning by Cleaning Tape]

Tools : • Cleaning Tape : BCT-5CLN or BCT-D12CL
(standard products)

Procedures :

1. Inserts the cleaning tape to the unit.
2. Runs the cleaning tape in the playing mode at 5 seconds.
3. Take out the cleaning tape.

(NOTE) Be sure to use the cleaning tape the BCT-5CLN or BCT-D12CL. If the cleaning is performed by other cleaning tape, not the BCT-5CLN or BCT-D12CL, unusual friction or damage of the video head may occur.

[Cleaning by Cleaning Cloth]

Tools : • Cleaning Cloth : 3-184-527-01 (size 150×150 mm) or
3-178-770-01 (size 240×240 mm)
• Cleaning Fluid : 9-919-573-01

Procedures :

1. Turn the power off.
2. The Cassette-up Compartment can be fully opened.
(Refer to Section 3-3).
3. Hold the cleaning cloth moistened with cleaning fluid keeping it from becoming wrinkled.
And perform the cleaning of the following.
The detail of the cleaning method is as shown below.
 - 2-4-1. Video Head
 - 2-4-2. Audio/TC, Audio Confidence Heads
 - 2-4-3. CTL, FE (Full Erase) Heads
 - 2-4-4. Tape Movement Areas
4. After cleaning, wipe it with a dry cleaning cloth two or three times.
5. Return to the Cassette-up Compartment.

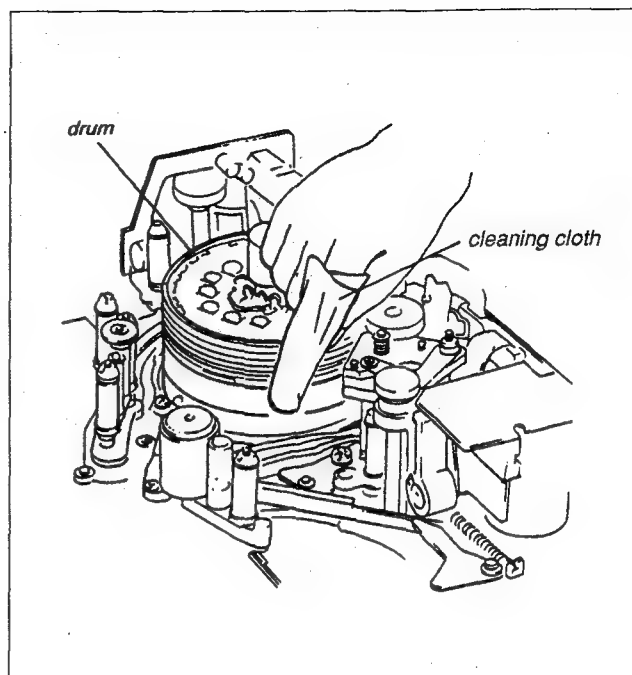
(NOTE) • Each block in the mechanical deck consists of a precision parts and is adjusted precisely.
Be careful not to damage each part and to apply an excessive force during cleaning.

- Do not touch the greased portions during cleaning. If the grease attach to a cleaning cloth, replace the cleaning cloth by new one. If a cleaning smeared with grease is used, grease may attach to the places where it should not.
- Do not insert a cassette tape before a cleaning fluid completely evaporates after cleaning.

2-4-1. Video Head

Press the cleaning cloth moistened with cleaning fluid and turn the drum slowly with hand.

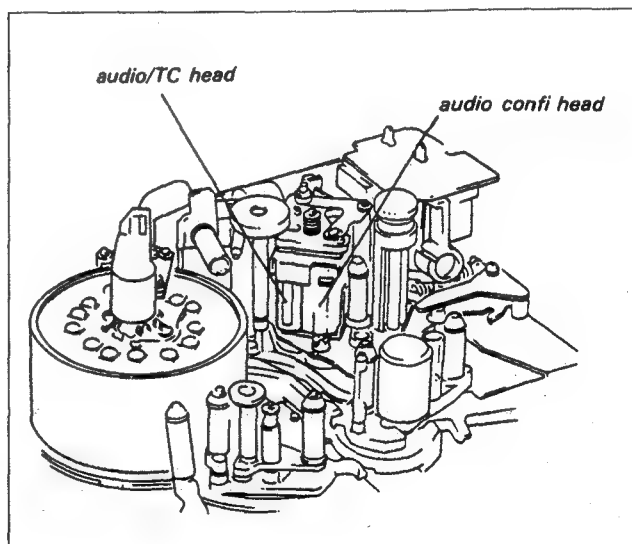
- (NOTE)
- Be sure to clean the head with the power off.
 - Never move the cleaning cloth in the vertical direction on the head tip during cleaning.
 - Do not use a head cleaner stick to clean the rotary heads.



2-4-2. Audio/TC, Audio Confidence Heads

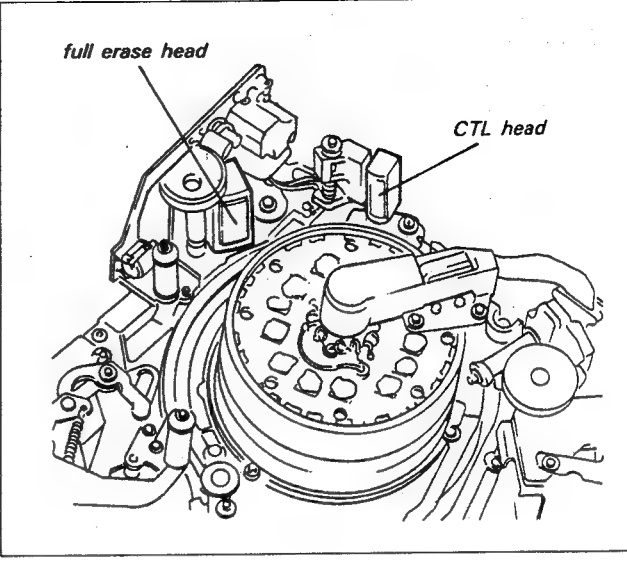
Clean with the cleaning cloth moistened with the cleaning fluid.

(In case of the cleaning of the Stationary Head, the head cleaner stick can be used instead of the cleaning cloth. Head Cleaner Stick: 3-601-330-01)



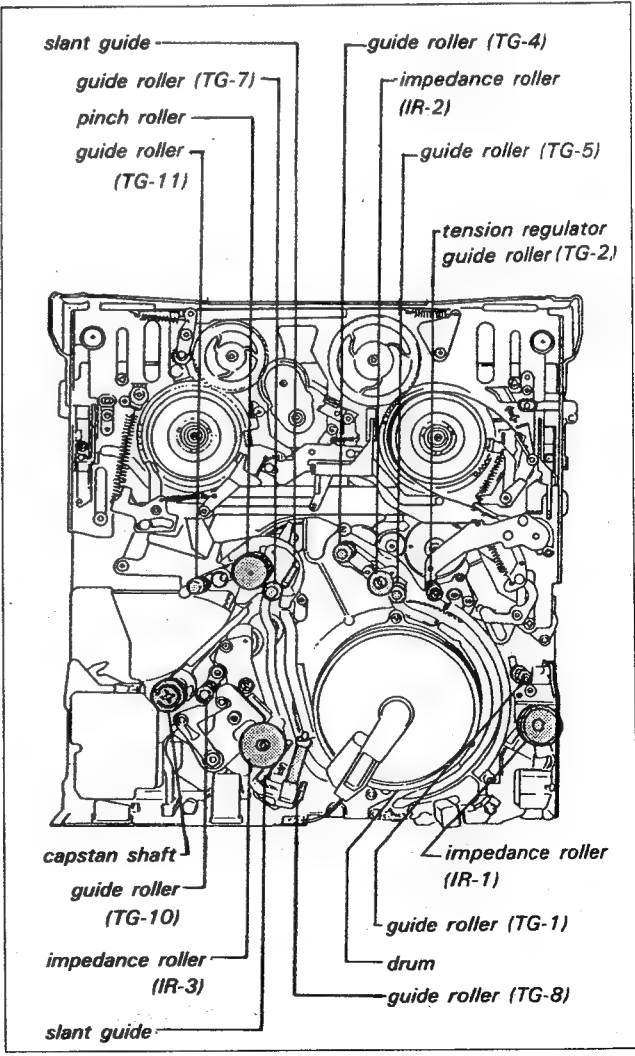
2-4-3. CTL, FE (Full Erase) Heads

Clean with the cleaning cloth moistened with the cleaning fluid.
 (In case of the cleaning of the Stationary Head, the head cleaner stick can be used instead of the cleaning cloth. Head Cleaner Stick: 3-601-330-01)



2-4-4. Tape Movement Areas

Clean with the cleaning cloth moistened with the cleaning fluid; tape guides, drum, capstan and the pinch roller as shown in the figure.

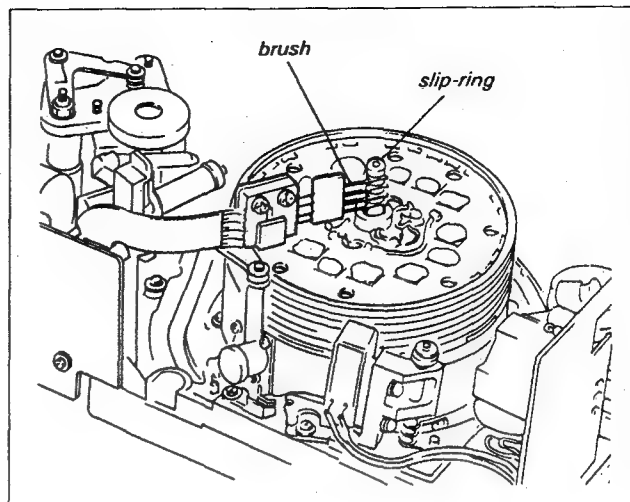


2-4-5. Slip-rings and Brushes

The Head Drum Assembly Slip-rings and Brushes do not require periodic cleaning. However, if dust adheres to the Slip-rings or Brushes, clean them as follows:

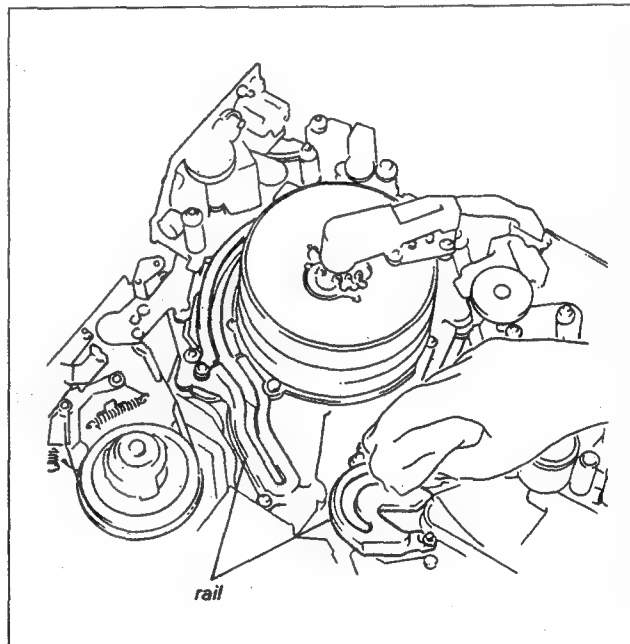
1. Clean the Slip-ring or Brush with a Soft brush which has short hairs. If this brush can not be obtained, use a Blower brush and Cotton Swab.
2. Cleaning fluid is not especially necessary. However, if it is difficult to remove persistent debris, use Freon as a cleaning agent.

(NOTE) • Do not use alcohol as a cleaning fluid. If the Slip-ring and the Brushes are cleaned with alcohol, the surface tends to attract material which may increase the resistance at the contact area.
• Do not use conductive grease.



2-4-6. Rail

Clean with the cloth moistend with the alcohol.

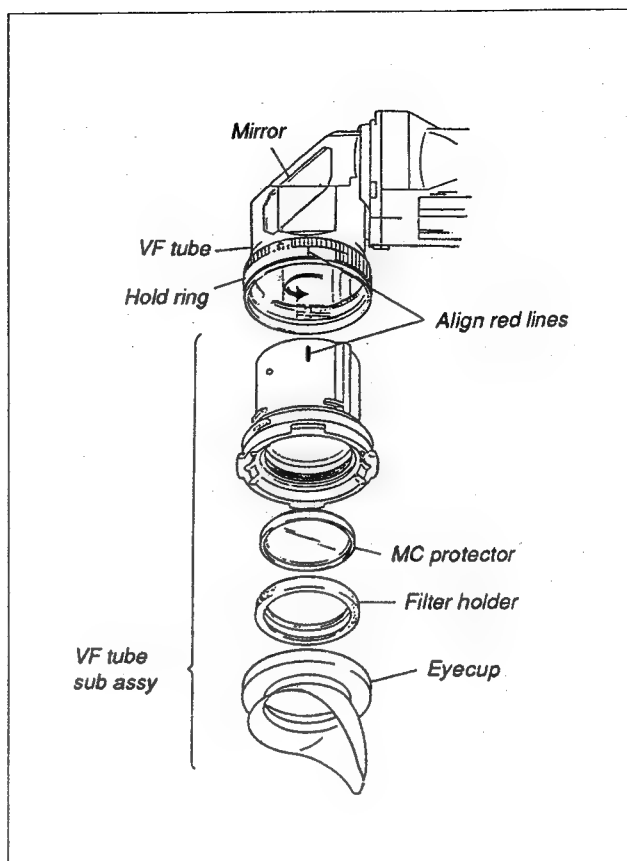


2-4-7. Viewfinder Lens

By extracting the VF tube sub assy, lens and MC protector can be easily cleaned. And also dust on the CRT surface or mirror can be easily cleaned off.

1. Turn the hold ring to the left and extract the VF tube sub assy.
2. Detach the eyecup.
3. Remove the MC protector together with the filter holder.
4. Clean the lens and MC protector with a commercially available camera lens cleaner. Blow off dust with a blower carefully so as not to flaw the mirror.
5. After the cleaning is completed, install by reversing the preceding steps. Align red lines of the VF tube and VF tube sub assy when inserting, and turn the hold ring to the right until it locks.

- (NOTE)
- Do not use any type of solvent, such as alcohol, benzine or thinner to remove stains.
 - Be sure to attach the eyecup to the VF, or the MC protector may come off.
 - To protect the viewfinder lens from drops, put the MC protector in the filter holder and attach the eyecup securely.
 - To prevent fog on a lens, an optional fog-proof filter (FP filter, Sony parts No. 1-547-341-11) is prepared. Use in place of the MC protector.



2-5. AFTER USED AT SEASIDE OR DUSTY AREAS

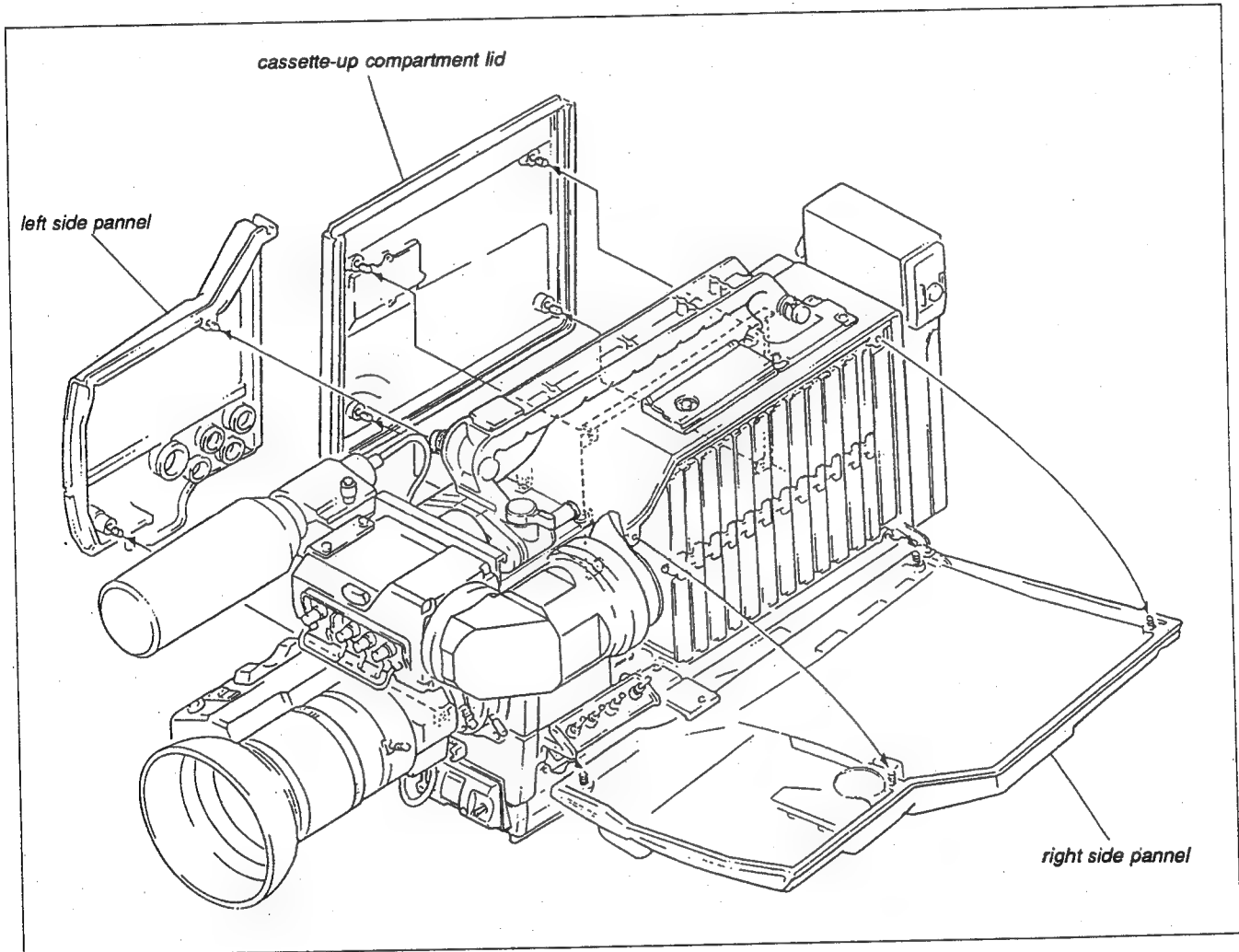
It is recommended to check the following items after the news gathering at seaside or dust areas.

1. Clean off sand and other dust in the unit with a cleaning cloth moistened with the cleaning fluid, or blow off with an air-brush carefully.
2. Clean the video head and stationary heads with a cleaning cloth moistened with the cleaning fluid.
3. Clean the tape movement areas (the drum surface, tape guides, capstan shaft and the pinch roller) with a cleaning cloth moistened with the cleaning fluid.
4. Clean the upper of chassis of the unit.
5. Clean the surface of the reel tables contacting with the brake shoes.
6. Rotate by hand and move the tape guides, pulley, capstan and the pinch roller, and check that any abnormal noise sounds or not. If there sounds a noise, replace the part immediately.
7. After the news gathering at seaside, remove the printed circuit board.
Clean the printed circuit board with a cleaning cloth moistened with the cleaning fluid after blow off sand on the completely. Then clean the soldering side in the same manners.
8. Clean the connector on the connector panel completely.
9. Perform the operation check and be sure that the machine operates normally.

SECTION 3 SERVICE INFORMATION

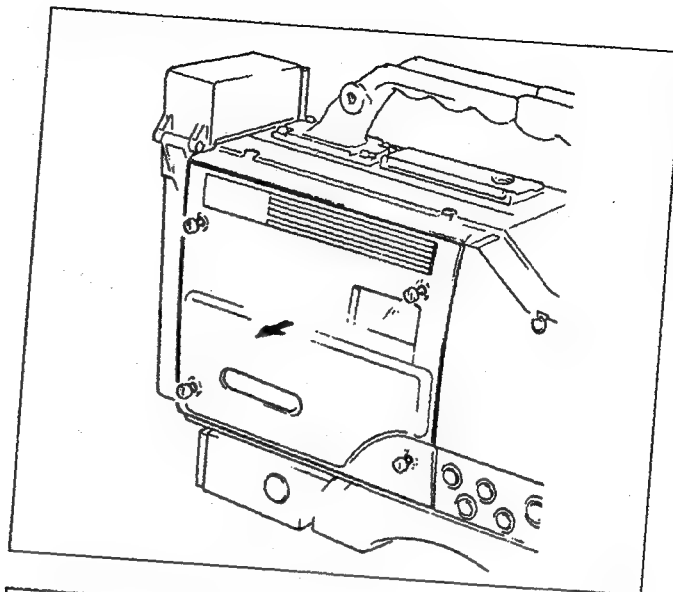
3-1. REMOVAL OF THE CABINET

Loosen the fixing screws shown in the figure, and remove the panels.

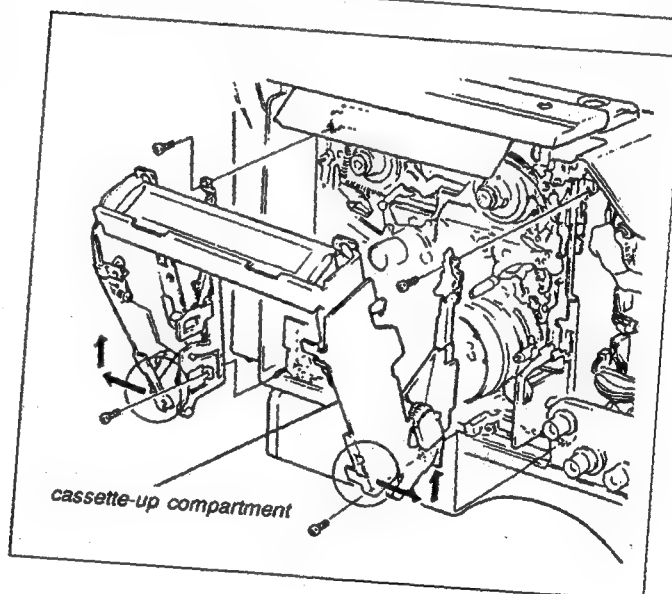


3-2. REMOVAL OF THE CASSETTE-UP COMPARTMENT

1. Loosen the four fixing screws and remove the Cassette-up Compartment Lid.



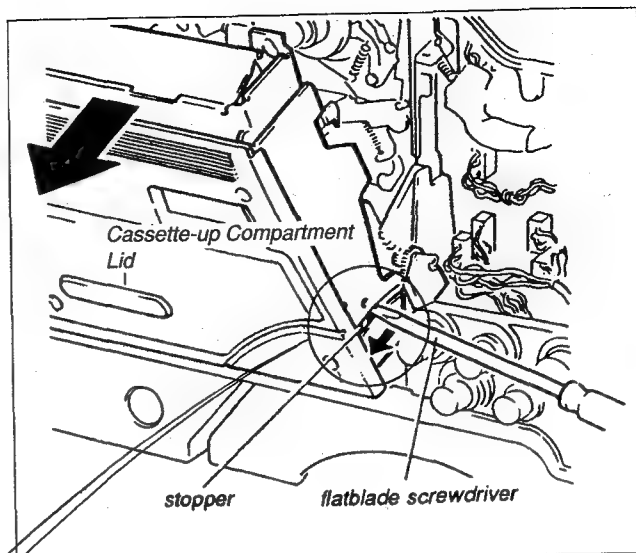
2. Remove the four fixing screws shown in the figure. Then move the Cassette-up Compartment in the direction of the arrows and remove it.



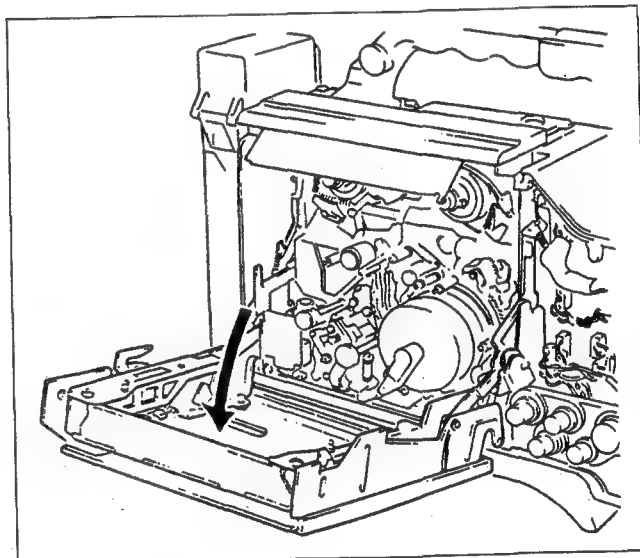
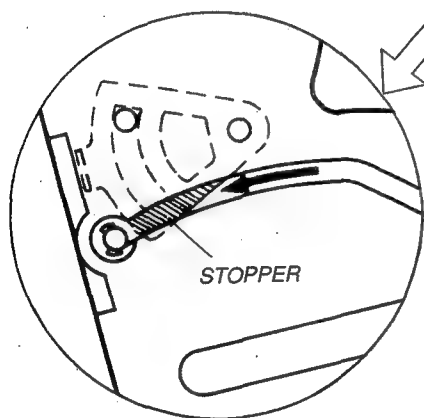
3-3. HOW TO FULLY OPEN THE CASSETTE-UP COMPARTMENT

The Cassette-up Compartment can be fully opened for tape movement area cleaning and heads cleaning.

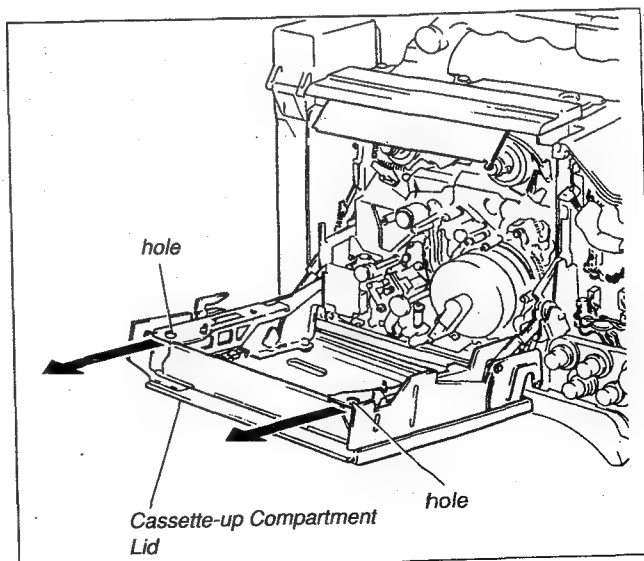
1. Put the unit into EJECT mode.
2. While pulling the Cassette-up Compartment Lid slightly to the direction of the arrow, release the stoppers by inserting the flatblade screwdriver into the groove on the left and right sides of the Cassette-up Compartment and moving it in the direction of the arrow as shown in the figure.



3. Then, the Cassette-up Compartment is fully opened.



4. When installing the Cassette-up Compartment, close the Cassette-up Compartment Lid while pulling the two holes to the direction of the arrows. If it is put back to the right position, it gives a click.

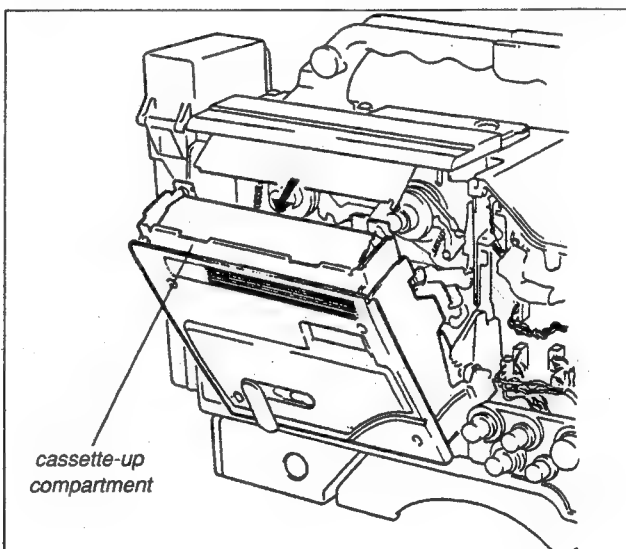
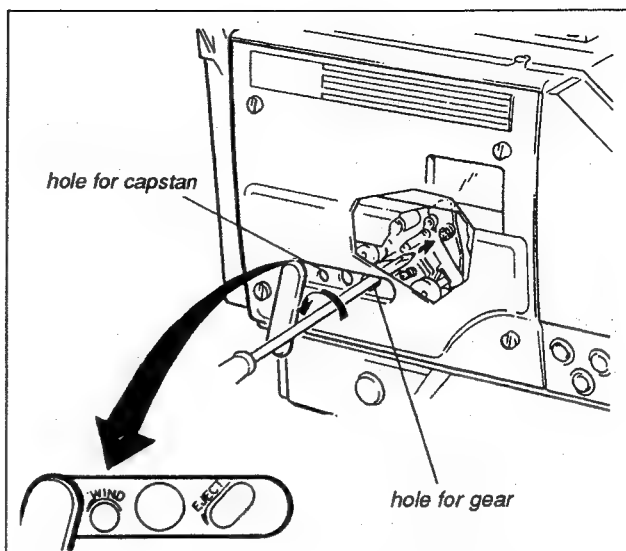


3-4. WHEN THE TAPE SLACKED IN THE UNIT, HOW TO REMOVE THE CASSETTE TAPE

1. Turn OFF the POWER switch.
2. Open the cover on the Cassette-up Compartment Lid.
3. While holding the Cassette-up Compartment by hand, insert the phillips type screwdriver into the hole for the gear shown in the figure and turn the gear about four times in the EJECT direction.
4. After detecting that the lock is released by hand, insert the screwdriver into the hole for capstan shown in the figure, and turn the Capstan in the WIND direction until the supply side Reel Table begin to rotate.
5. When the tape is wound into the cassette, pull out the screwdriver from the unit and release the hand from the Cassette-up Compartment.
6. Then, the cassette tape can be removed.

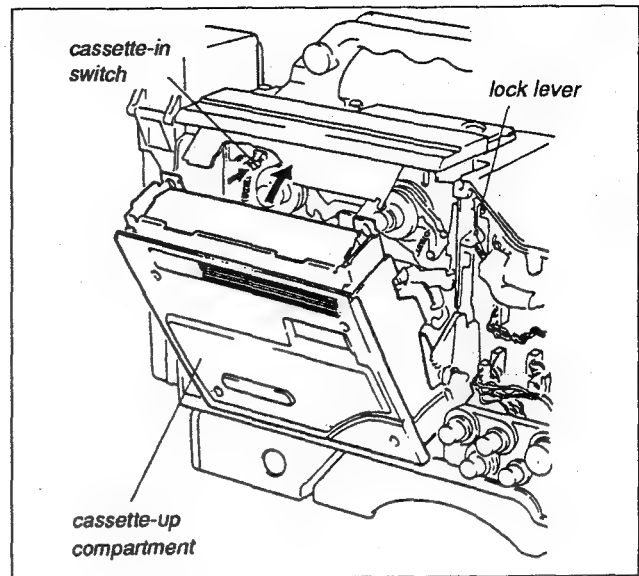
(NOTE) After remove the cassette tape, be sure to turn ON the POWER switch before close the Cassette-up Compartment.

If not, the Cassette-up Compartment is not locked, because the lock lever is not located in the normal position.



3-5. OPERATION OF THE UNIT WITHOUT THE CASSETTE TAPE

1. Put the unit into EJECT mode.
2. Open the Cassette-up Compartment fully. (Refer to Sec.3-3)
3. While pressing the Cassette-in switch, press the stopper of the lock lever with a pencil lead or similar object and lock the stopper.
4. After the movement of the Reel Chassis is completed, release the Cassette-in switch.
5. Press the desired function button.



3-6. EXTENSION BOARD

The amplifier chassis printed circuit boards listed below can be serviced by using Extension Board, EX-148. Simply insert the Extension Board into the amplifier chassis and connect the circuit board to be serviced to the end of the Extension Board.

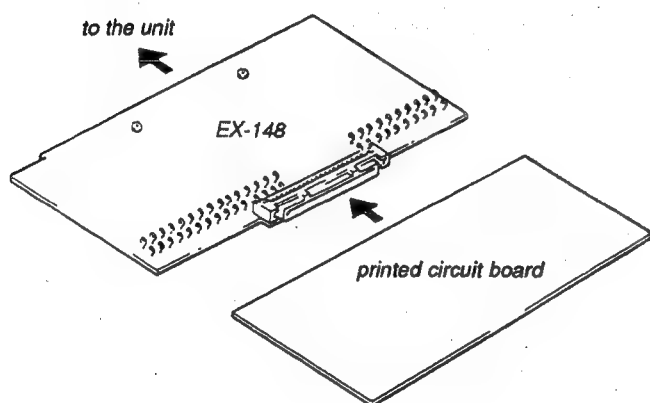
(NOTE) Be sure to turn OFF the POWER before inserting or removing the Extension Board or printed circuit boards.

Connectable printed circuit board

AT-49A	VP-24P
IE-30AP	VDA-11P
VA-83	AFM-6P
PR-176	AU-97P
EN-79P	SV-97AP
SG-152P	SY-117CP
DC-DC CONVERTER CD-89	

3-7. NOTES FOR ADJUSTMENT OF THE PRINTED CIRCUIT BOARDS

- (1) Power is supplied irrespective of POWER switch is turned OFF, because of back up of the time code data. When disconnecting the FL-57 flexible printed circuit board connected to the TC-48AP board, turn OFF the POWER switch, remove the battery and disconnect the cable from the DC IN connector.
- (2) If the protect circuit of the DC-DC converter CD-89 is activated because of the short circuit of power circuit, turn OFF the POWER switch once, after a while, about more than one minute later, turn ON the POWER switch.



3-8. SERVICE OF THE PRINTED CIRCUIT BOARD

- **TC-48AP Board**

If the TC-48AP board is replaced, be sure to mount the non-volatile memory (Ref. No. IC515) that is used in the unit before.

- **MB-317AP Board**

When replacing the MB-317AP board, remove the all plug in printed circuit board, and remove the upper and lower PC board guides.

- **BI-22, BI-23, BI-24 Boards**

The BI-22, 23, 24 board on which the CCD is mounted had better not be removed. When removing it, the CCD is sometimes broken by the static electricity. If the CCD is broken, the whole CCD unit must be replaced.

3-9. DISCONNECT AND CONNECT OF THE FLEXIBLE PRINTED CIRCUIT BOARD

1. Turn the POWER OFF, remove the battery and disconnect the DC IN connector.
2. Disconnect and install the flexible printed circuit board as shown in the figure.

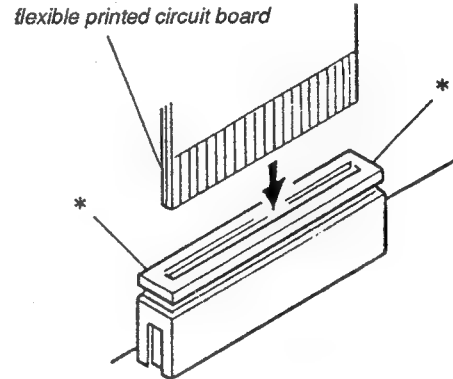
<Straight Type>

Disconnecting procedure

Pull up the * marked portions of connector, and pull out the flexible printed circuit board from the connector.

Installing procedure

Install the flexible printed circuit board as far as it will go until the line indicated on the flexible printed board, and push down the * marked portions of connector.



<Angle Type>

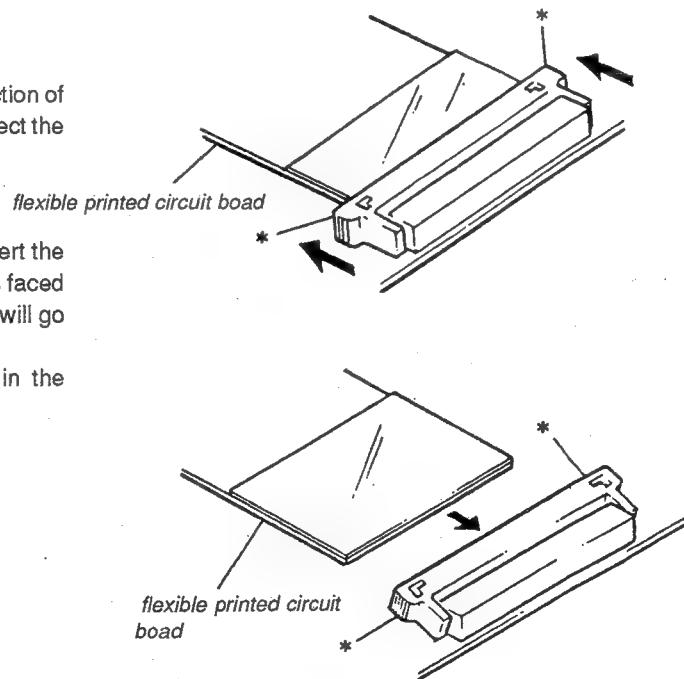
Disconnecting procedure

Slide the * marked portions of connector in the direction of the arrows, pull up the connector, and then disconnect the flexible printed circuit board from the connector.

Installing procedure

Pull up the * marked portions of the connector, insert the flexible printed circuit board on its contacting side is faced to the printed circuit board, and insert it as far as it will go until the line indicated on the flexible board.

Push down the * marked portions, then slide it in the direction of the arrow to lock.



- (NOTE)
1. Not install the flexible printed circuit board on a slant.
 2. Not short the terminal of the flexible printed circuit board.

3-10. CAUTION FOR ELECTRICAL PART REPLACEMENT

3-10-1. Chip Parts Replacement Procedure

Tools: Soldering iron of 20W (Use a temperature controller, if possible, which can control the iron temperature to $270 \pm 10^\circ\text{C}$)
Desoldering metal braid (Solder Wick or equivalent)
Solder (0.6 mm dia.)
Tweezers

Soldering Conditions: Tip temperature; $270 \pm 10^\circ\text{C}$ within the 2 seconds



1. To remove a resistor or capacitor, place the tip of a soldering iron on chip parts to heat the parts, and then move it horizontally for removal while being desoldered. For removal of a diode or transistor, heat the one side, with two pins, of chip parts at the same time, set the parts up when desoldered, and remove the two pins. And then, remove the pin on another side.
2. Absorb solder by using a desoldering metal braid to smooth the land surface of board after removal.
3. Confirm by visual check that no pattern of the removed chip parts is peeled off and no adjacent parts is damaged or bridged.
4. Perform a thin pretinning on the pattern.
5. Place new chip parts on the pattern to solder its both sides.

(NOTE) • The chip part removed should not be used again.
• When mounting the new chip part, should not shift so that it not short.
• Use the soldering iron vertically as much as possible.
• When mounting the new chip part, heat it from pattern side. Never contact the tip of the soldering iron to the part.

* When removing the IC, it is recommended that the following TECHNO DESIGN soldering iron be used.

TOP-482 for SOP
TOP-483 for QFP
TOP-480 temperature controller
for TOP-482,483

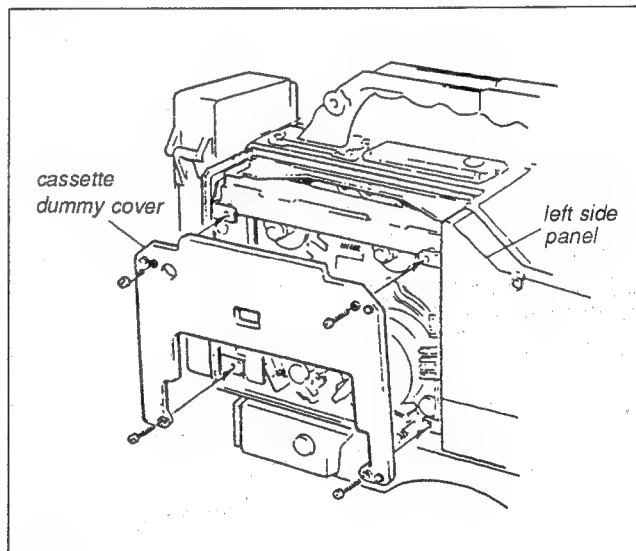
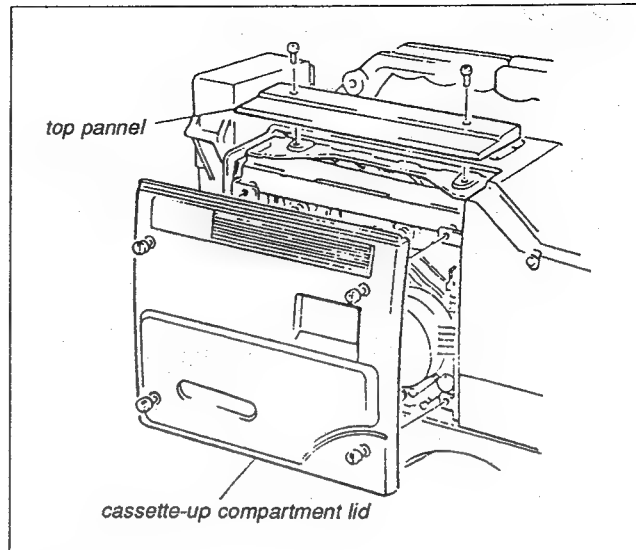
3-11. SPARE PARTS

1. The shaded  and  marked components are critical to safety.
Replace only with the same components as specified.
2. Replacement parts supplied from the Sony Parts Center will sometimes have a different shape and outside view from the parts which are used in the unit. This is due to "accommodating improved parts and/or engineering changes" or "standardization of genuine parts".
 - This manual's exploded views and electrical spare parts lists indicate the part numbers of "the present standardized genuine parts".
 - Regarding engineering part changes by our engineering department, refer to Sony service bulletins and service manual supplements.
3. The parts marked with "s" in the SP column of the exploded views and electrical spare parts lists are normally stocked for replacement purposes. The parts marked with "o" in the SP column are not normally required for routine service work. Orders for parts marked with "o" will be processed, but allow for additional delivery time.

3-12. REMOVAL OF THE MECHANICAL DECK BLOCK

1. Put the unit into the threading end mode.
2. Remove the Top Panel.
3. Remove the Cassette-up Compartment Lid and install the Cassette Dummy Cover which is prepared for service.
4. Remove the Left Side Panel.
5. Remove the four screws which secure the mechanical deck block to the unit by using the hexagon bit (J-6326-120-A).
6. Remove the mechanical deck block from the unit while removing the connectors below on the mother board.
Drum : CN41 and CN42
FE-4 board : CN43
TB-5 board : CN44

(NOTE) When installing the mechanical deck block, perform the tape run check or alignment in Section 6.



3-13. USE OF THE SERVO REMOTE CONTROL TOOL

For servo system alignment and mechanical alignment, it is recommended to use the SERVO REMOTE CONTROL TOOL (EW-229).

(1) Connection

1. Connect the connector (14P, female) of the supplied harness to the tool.
2. Connect the other side of the connector of the harness to CN2/SV-97A board of the VTR.

(2) Function of switches and test points

The desired mode can be obtained by push switches and rotary switch on the function control panel of this tool.

• TRCON switch

After the rotary switch is set to the "F" position, turn ON this switch. Then LED lights, tracking control is possible by pressing the "+" button or the "-" button.

When turned OFF, return the unit to the just tracking mode. The memory is cleared by disconnecting the connector of the tool from the CN2/SV-97AP board.

• SW POSITION switch

After the rotary switch is set to the "F" position, turn ON this switch. Then LED lights, the switching position is shifted by pressing the "+" button or the "-" button.

• REC SERVO switch

Extend the SV-97AP board by using the EX-148 extension board. After the rotary switch is set to the "F" position, open or short the TP11/EX-148 board. Then the following mode is obtained.

- After the TP11/EX-148 board is opened, turn ON this switch. Then LED lights, the capstan servo circuit is put into the REC SERVO mode.
- After the TP11/EX-148 board is shorted with GND, turn ON this switch. Then LED lights, the unit is put into the back space editing alignment mode.

• REV button

The unit is put into REV mode by pressing this button. Press the STOP button on the VTR, the unit is put into the STOP mode.

• SW PULSE test terminal

The switching pulse signal is appeared at this test terminal.

• CTL test terminal

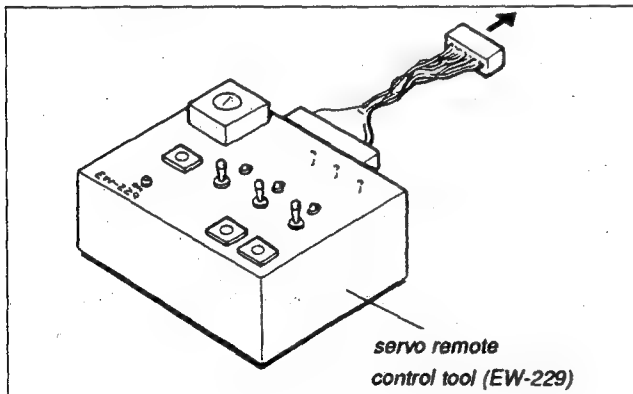
The CTL signal is appeared at this test terminal.

• Rotary switch

The mode described in the following table is obtained by setting the rotary switch to "0" through "F" positions. However the rotary switch is set to the same position, the different mode can be obtained by shorting between TP11/EX-148 board and GND. (In this mode, extract the SV-97AP board, and extend it with EX-148 extension board.)

When the rotary switch is set to the specified positions, it is necessary to mute the slack detection circuit.

The slack detection circuit can be muted by turning ON the S1/SY-117CP board.



Rotary Switch	TP11/ EX-148	Mode	For use
0	OPEN	Drum rotating. Capstan rotating. The CH-1 head of luminance or chrominance is selected.	Recording/playback is possible with the CH-1 head only of luminance or chrominance. This mode is used for check and adjustment to the CH-1 head for luminance or chrominance.
	Short with GND	Phase servo circuit of the drum is turned to OFF.	Check the servo system circuit.
1	OPEN	Drum rotating. Capstan rotating. The CH-2 head of luminance or chrominance is selected.	Recording/playback is possible with the CH-2 head only of luminance or chrominance. This mode is used for check and adjustment to the CH-2 head for luminance or chrominance.
	Short with GND	_____	_____
2	OPEN	Drum rotating. Capstan rotating. The CH-3 head of luminance or chrominance is selected.	Recording/playback is possible with the CH-3 head only of luminance or chrominance. This mode is used for check and adjustment to the CH-3 head for luminance or chrominance.
	Short with GND	_____	_____
3	OPEN	Drum rotating. Capstan rotating. The CH-4 head of luminance or chrominance is selected.	Recording/playback is possible with the CH-4 head only of luminance or chrominance. This mode is used for check and adjustment to the CH-4 head for luminance or chrominance.
	Short with GND	The capstan rotates at 1/6 times normal speed.	Check the CTL signal output at 1/6 times normal speed. (Before the check, mute the slack detection circuit.)
4	OPEN	Drum rotating is stopped. The switching pulse selects each channel. (Mute the slack detection circuit.)	
	Short with GND	The capstan rotates at three times normal speed.	Check the servo system circuit.

Rotary Switch	TP11/ EX-148	Mode	For use
5	OPEN	Drum rotating is stopped. The switching pulse selects the CH-1 head of luminance or chrominance. (Mute the slack detection circuit.)	
	Short with GND	_____	_____
6	OPEN	Drum rotating is stopped. The switching pulse selects the CH-2 head of luminance or chrominance. (Mute the slack detection circuit.)	
	Short with GND	_____	_____
7	OPEN	Drum rotating is stopped. The switching pulse selects the CH-3 head of luminance or chrominance. (Mute the slack detection circuit.)	
	Short with GND	_____	_____
8	OPEN	Drum rotating is stopped. The switching pulse selects the CH-4 head of luminance or chrominance. (Mute the slack detection circuit.)	
	Short with GND	_____	_____
9	OPEN	Capstan rotating is stopped in the PAUSE mode.	Tape path alignment. (Before the alignment, mute the slack detection circuit.)
	Short with GND	_____	_____

Rotary Switch	TP11/ EX-148	Mode	For use
A	OPEN	_____	_____
	Short with GND	_____	_____
B	OPEN	_____	_____
	Short with GND	_____	_____
C	OPEN	_____	_____
	Short with GND	_____	_____
D	OPEN	The overlap is increased of 3H in each entrance and exit side.	Check the quantity of overlap.
	Short with GND	_____	_____
E	OPEN	The limit of the RF alarm detection is increased.	RF alarm alignment.
	Short with GND	_____	_____
F	OPEN	Normal mode.	_____
	Short with GND	Normal mode.	_____

3-14. MAINTENANCE TOOL

Part Number	Description	For use
J-6001-820-A	DRUM ECCENTRICITY GAUGE (3)	Upper drum eccentricity adjustment
J-6001-830-A	DRUM ECCENTRICITY GAUGE (2)	Upper drum eccentricity adjustment
J-6026-100-A	RESOLUTION CHART	Measurement of Pick-up Tube Response
J-6026-130-B	GRAY SCALE CHART	Measurement of Pick-up Tube Response
J-6029-140-A	PATTERN BOX, PTB-500	Camera System Alignment
J-6080-003-C	FWD BACK TENSION MEASUREMENT CASSETTE	FWD torque adjustment
J-6086-570-A	PLATE, PARALELL	Audio head zenith adjustment
J-6152-450-A	WIRE CLEARANCE CHECK GAUGE	Clearance check
J-6321-500-A	TAPE GUIDE ADJUSTMENT DRIVER	Tape path adjustment
J-6321-880-A	CASSETTE DUMMY COVER	Mechanical deck adjustment
J-6325-110-A	TORQUE DRIVER BIT (FOR M1.4)	Parts replacement
J-6325-360-A	FLATNESS CHECK TOOL	Assembling the frame
J-6325-380-A	TORQUE DRIVER BIT (FOR M2)	Parts replacement
J-6325-400-A	TORQUE DRIVER (FOR 3kg)	Parts replacement
J-6325-530-A	DRUM ECCENTRICITY GAUGE (6)	Upper drum eccentricity adjustment
J-6326-120-A	HEXAGON BIT	Removal of the mechanical deck block
J-6332-290-A	SERVO REMOTE CONTROL TOOL	Mechanical deck and servo system adjustment
J-6335-710-A	REC CURRENT ADJUSTMENT TOOL	REC current adjustment tool
J-6336-070-A	SETUP ATTENUATOR TOOL	Video system adjustment
J-6335-730-A	VIDEO SIGNAL INPUT BOARD	Video system adjustment
J-6335-740-A	EXTENSION HARNESS	Mechanical deck adjustment
7-732-050-20	TENSION SCALE (50g FULL SCALE)	Tension adjustment
7-723-902-00	INSPECTION MIRROR	Video Tracking Adjustment
8-960-096-51	ALIGNMENT TAPE, CR2-1BPS	TAPE Run Alignment
8-960-096-91	ALIGNMENT TAPE, CR5-1BPS	Video System Adjustment (METAL)
8-960-098-44	ALIGNMENT TAPE, CR5-2APS	Video System Adjustment (OXIDE)
8-960-098-45	ALIGNMENT TAPE, CR8-1APS	Audio System Adjustment, TAPE Run Adjustment (OXIDE)
8-960-096-86	ALIGNMENT TAPE, CR8-1BPS	Audio System Adjustment, TAPE Run Adjustment (METAL)
9-911-053-00	THICKNESS GAUGE	Clearance Check

3-15. PRECAUTIONS ON TIGHTENING THE SCREWS

(1) The Fixing Screws to the Chassis

The BVW-300AP is compact and lightweight, so many M1.4 x 2.5 screws (1.4mm dia.) and M2 x 5 and M2 x 8 screws (2mm dia.) are employed. A magne-diecast chassis is employed.

Pay careful attention to the tightening torque when tightening the screws. Stronger torque may damage the chassis screws. The torque screwdriver and bits below are provided.

Torque driver	J-6325-400-A
Bit for M1.4	J-6325-110-A
Bit for M2	J-6325-380-A

Screw M1.4 torque: $0.9 \pm 0.1 \text{ kg.cm}$
Screw M2 torque: $3.0 \pm 0.5 \text{ kg.cm}$

The above torque driver can be used for both screws M1.4 and M2.

If you damage the chassis screws when tightening screw M1.4, use the following screw:

M1.7 x 3 (2-641-348-02)
or
M1.4 x 5 (3-729-013-71)

To distinguish the above screw from screw M1.4, mark the screw top in red. Apply the locking compound at the same time.

(2) The Locking Screw of the Tape Guide Upper Flange

When the height adjustment of the tape guide is performed in the Tape Run Alignment, use the tape guide adjustment driver (J-6321-500-A) prepared for the maintenance tool. After the height adjustment of the tape guide is completed, tighten the locking screw of the tape guide upper flange with the torque driver by the following procedures.

Torque Driver	J-6325-400-A
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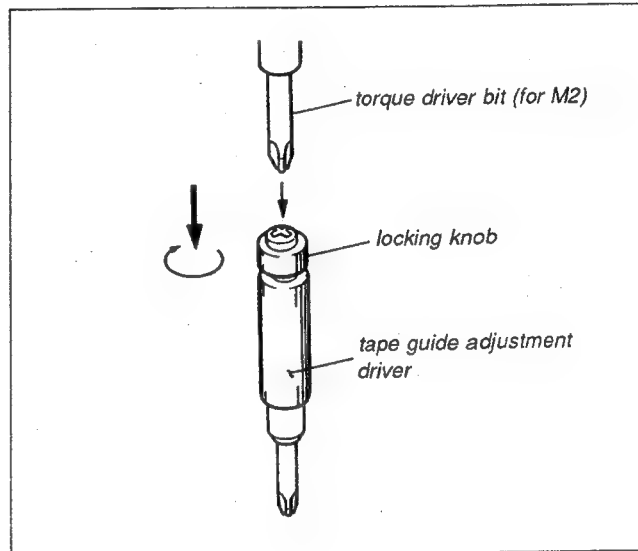
Torque Driver Bit (For M2)

J-6325-380-A

Tightening Torque

$0.9 \pm 0.1 \text{ kg.cm}$

- Set the torque driver bit (for M2) on the torque driver.
- Set the torque driver on the screw at the top of the locking knob of the tape guide adjustment driver.
- Push down the torque driver and turn it clockwise.



3-16. INSTALLATION OF THE REEL CHASSIS

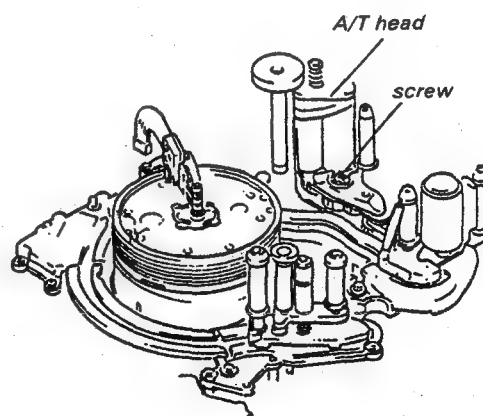
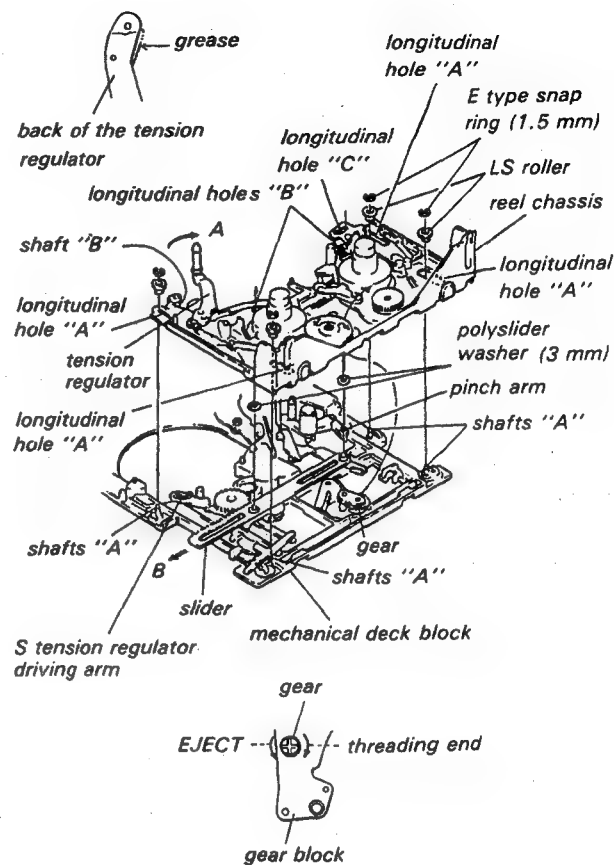
- When removing or installing the Reel Chassis, remove the Mechanical Deck Block from the unit. (Refer to Sec. 3-12. Removal of the Mechanical Deck Block.) The following is the procedure for installation of the Reel Chassis.

Tool: Sony grease
Sony oil

Mode: EJECT

Installation procedure:

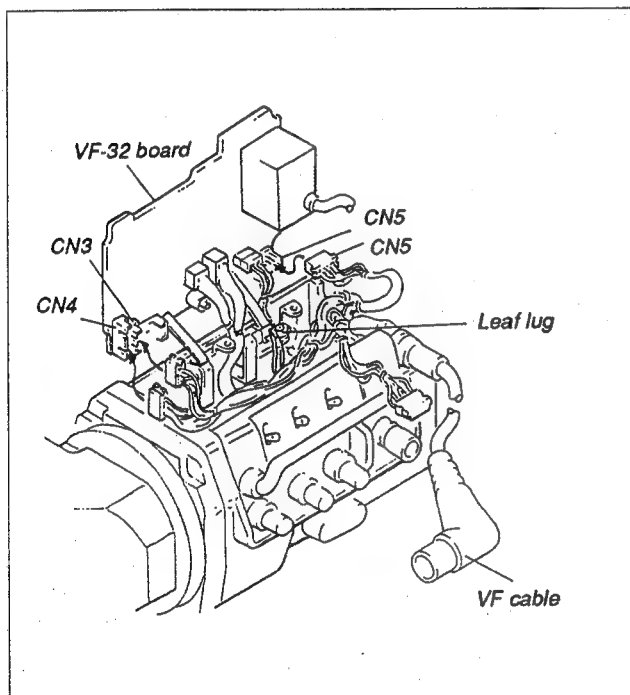
- (1) Smear Sony grease on the back of the Tension Regulator of the Reel Chassis Assembly as shown in the figure.
- (2) Gently push the Tension Regulator Arm in the direction of the arrow A.
- (3) Apply a 1/4 drop of Sony oil on each of the four shafts "A" of the Mechanical Deck Block.
- (4) Move the slider in the direction of the arrow B fully by hand.
- (5) Insert 3mm diameter polyslider washers (0.5mm thick) (3-701-439-21) onto the two shaft of the slider.
- (6) Insert the Reel Chassis in the direction shown in the figure so that the gear is not contact with the reel chassis.
 - (i) Insert the four shafts "A" of the Mechanical Deck Block into the four longitudinal holes "A" of Reel Chassis.
 - (ii) Insert the two longitudinal holes "B" onto the two shafts of the Reel Chassis.
 - (iii) Insert the longitudinal hole "C" of the Reel Chassis onto the Pinch Arm Roller.
 - (iv) Insert the shaft "B" of the Reel Chassis into the longitudinal hole of the S Tension Regulator Driving Arm.
- (7) Insert the LS Roller (3-723-007) onto the four shafts "A" of the Mechanical Deck Block as shown in the figure. Fasten with the E type stop ring (1.5mm).
- (8) Turn the screw on the front of the A/T Head by the screwdriver, and repeat threading and unthreading two or three times and check that they can be done smoothly.



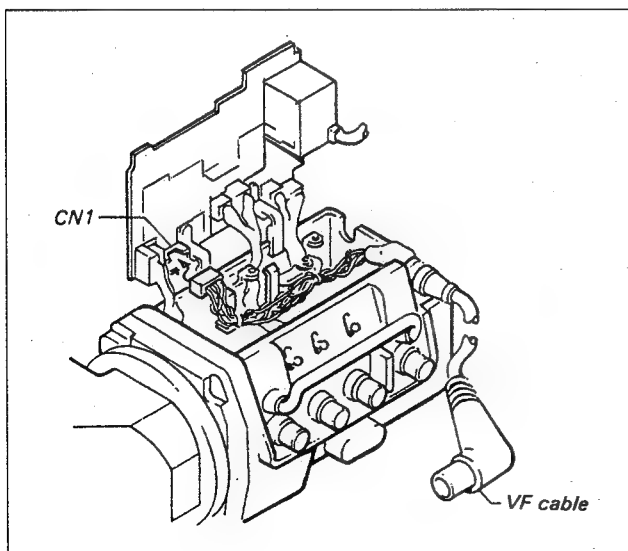
S/N: 41954 through 43999

3-17. ARRANGEMENT OF THE VF HARNESS

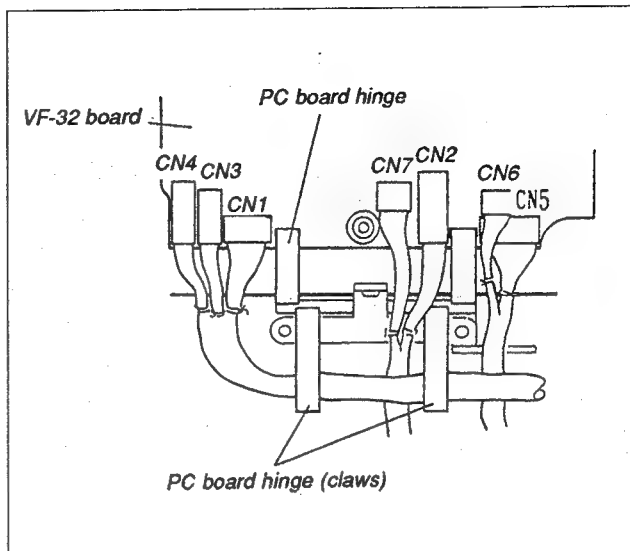
1. Place the VF connector as shown in the figure, and arrange them on the harness of the Leaf Lug and then, connect the connectors CN3, CN4 and CN5 to the VF-32 board.



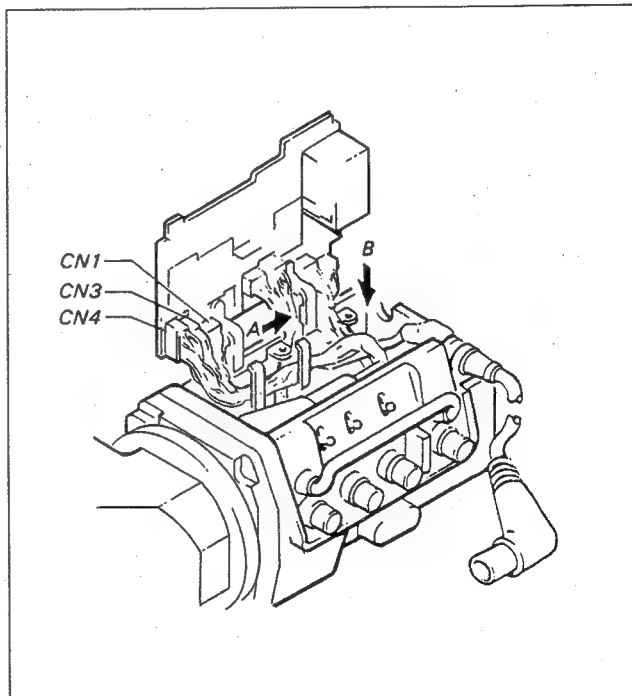
2. Connect CN1 of the VF cable to the VF-32 board.



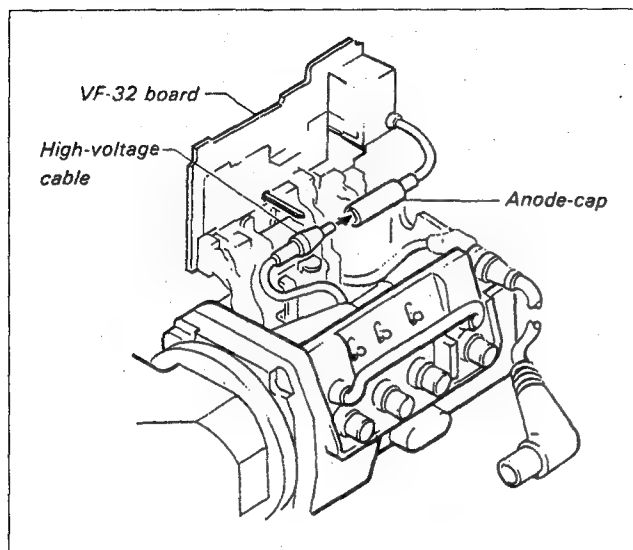
3. Arrange the harness of the CN2, CN6, and CN7 as shown in the figure, and push the harness of the CN1, CN3 and CN4 into the claws of the PC Board Hinge.



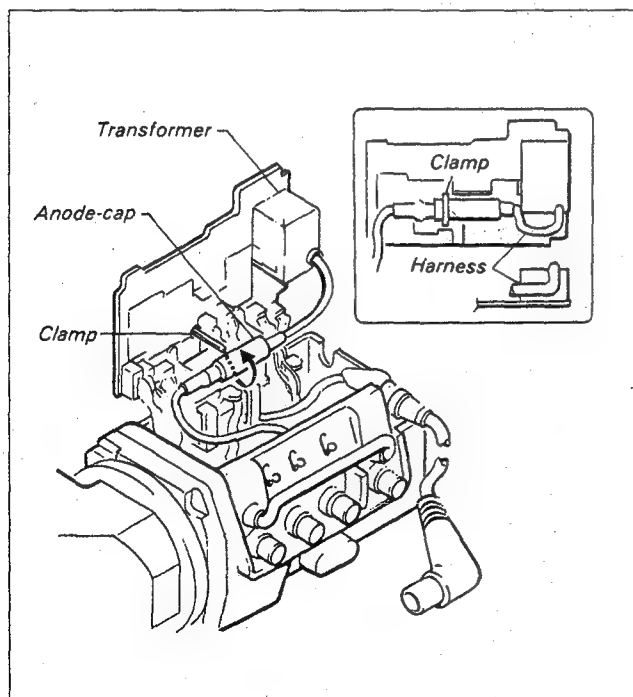
4. Gather the slackening of the harness of CN1, CN3 and CN4 in the direction of the arrow A and push into them in the direction of the arrow B.



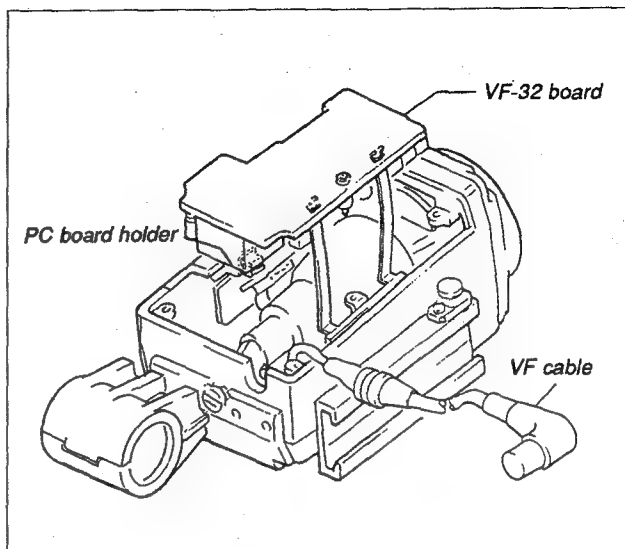
5. Insert the high-voltage cable from the CRT to the anode-cap of the VF-32 as far as locked.
(Be free the high-voltage cable from the other harness.)



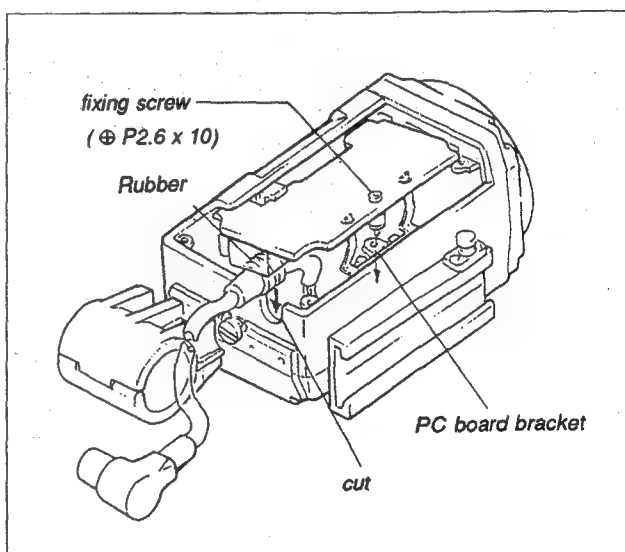
6. Clamp the anode-cap with the clamp of the VF-32 as shown in the figure and arrange it on side of the transformer.



7. Place the VF cable as shown in the figure and install the VF-32 board on the PC Board Holder.



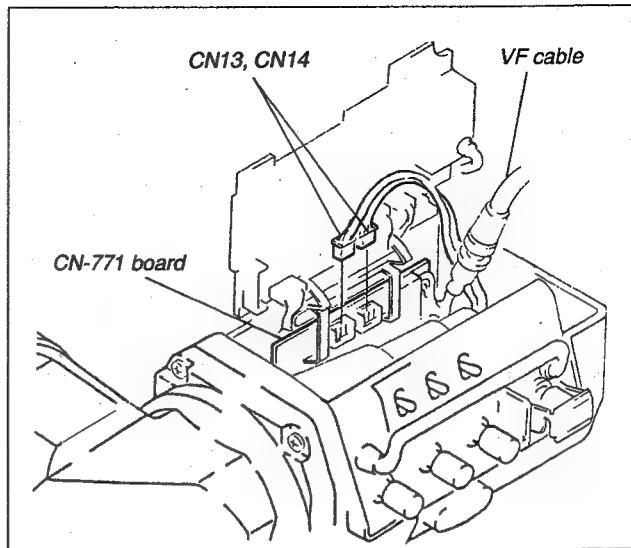
8. Install the VF cable as shown in the figure, and close the VF-32 board. Then tighten the Board with the supplied fixing screws.



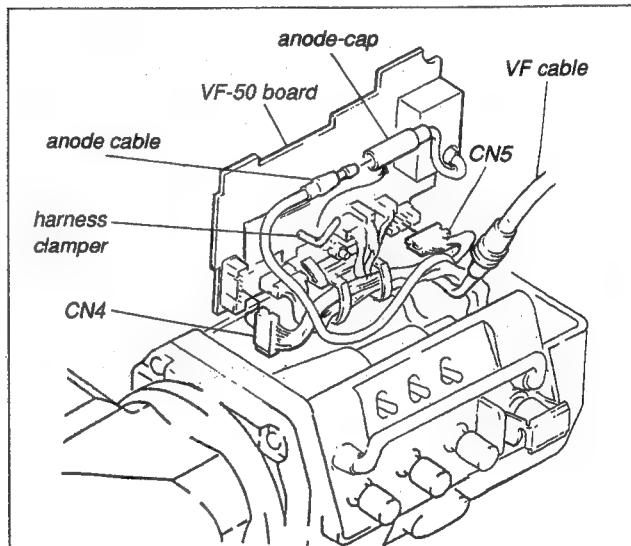
S/N; 44001 and higher

3-17. ARRANGEMENT OF THE VF HARNESS

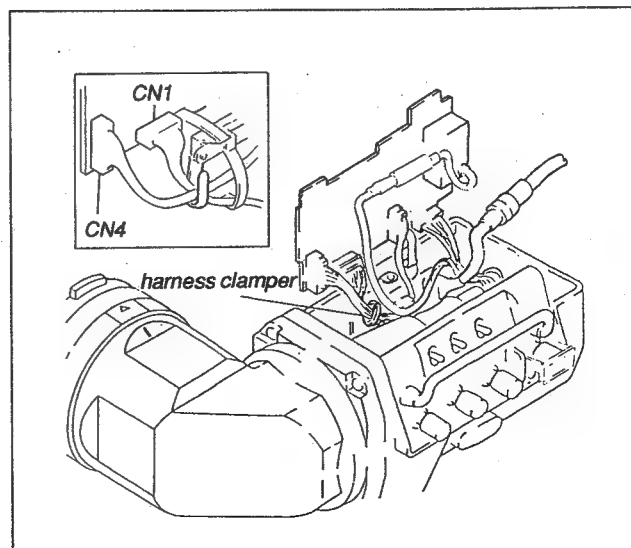
1. Connect the harness of the LP-64/65 Board to CN13 and CN14 of the CN-771 Board.
 - Arrange the harness around the back of the VF cable as shown in the figure.



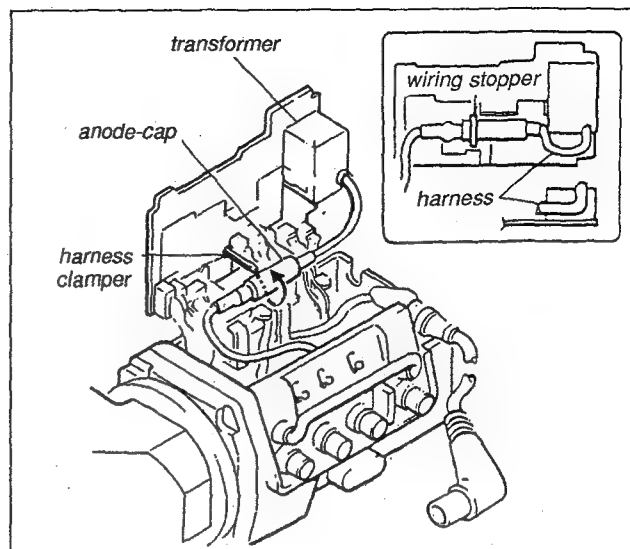
2. Connect the harness of the CRT to CN4 and CN5 of the VF-50 Board.
 - Arrange the harness around the back of the VF cable as shown in the figure.
3. Insert the anode cable into the anode-cap of the VF-50 Board until locks.



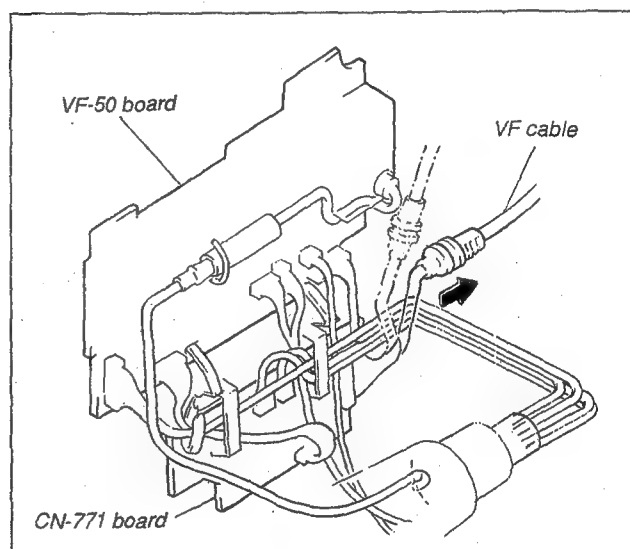
4. Clamp the harness of CN1 and CN4 and anode cable with a harness clumper.



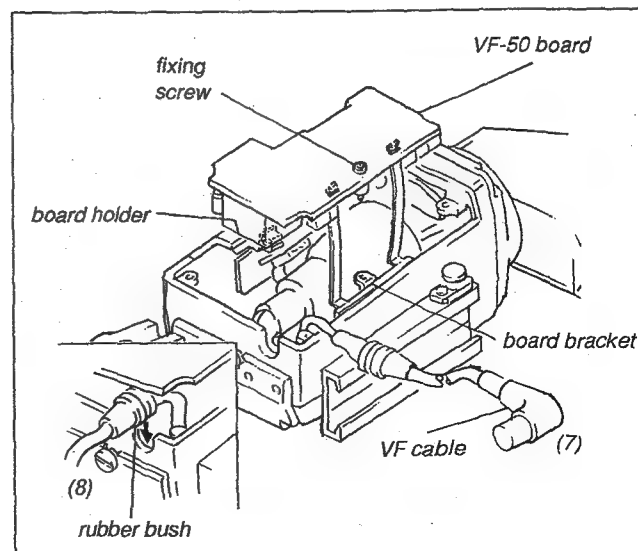
5. Clamp the anode-cap at the position shown in the figure with the harness clamber of the VF-50 Board, and arrange the harness around the side of the Transformer.



6. Check that the harness has been arranged as shown in the figure. Pull the harness of the CRT in the direction of the arrow with the VF cable.



7. Insert the VF-50 Board into the Board holder with the VF cable at the position shown in the figure.
8. Adjust the rubber bush of the VF cable to the notch of the VF and insert, and close the VF-50 Board.
9. Fix the VF-50 Board onto the Board brackets with the fixing screw.



SECTION 4 REPLACEMENT OF THE MAJOR PARTS

PRECAUTIONS WHEN REPLACING PARTS

1. The mode of the unit when replacing parts is described in the Parts Replacement. The following is the description of the modes.

- **EJECT:** In this mode, the Pinch Roller, Tension Regulator Arm, T Base, and S Base have all completely returned to the reel table side. This condition can be set by turning the screw shown in the figure counterclockwise.

- **Threading end:**

In this mode the Pinch Roller is placed in front of the Capstan Shaft, the T Base and S Base are in the positions of the T Support Bracket and S Support Bracket, and the Tension Regulator Arm is completely open.

This condition can be set by turning the screw shown in the figure clockwise.

2. Replace parts with the VTR installed onto the unit, unless otherwise specified. At that time, open the Cassette-up Compartment fully. (Refer to Section 3-3).

3. The polyslider washers used to fix parts should not be used again once they have been removed. Use a new one after replacement.

When installing a polyslider washer to the shaft, push the polyslider washer until the space between it and the part is about 0.1 to 0.2mm.

1.2mm diameter polyslider washer:

3-559-408-11

1.5mm diameter polyslider washer:

3-321-813-01

4. When tightening screws, be sure to keep the tightening torque. The torque driver and bits are provided.

J-6325-400-A Torque driver (for 3kg)

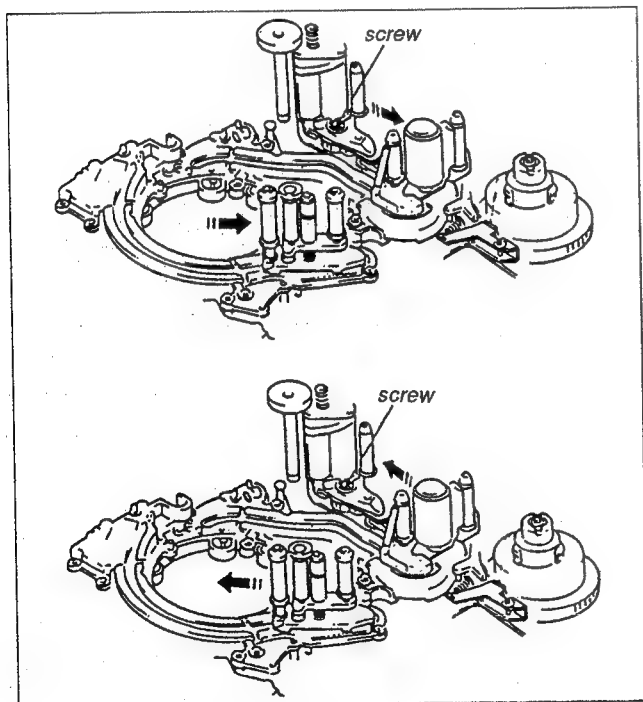
J-6325-110-A Torque driver bit (for M1.4)

J-6325-380-A Torque driver bit (for M2)

Tightening torque

1.4mm dia.screw: 0.9 ± 0.1 kg.cm

2mm dia.screw: 3 ± 0.5 kg.cm

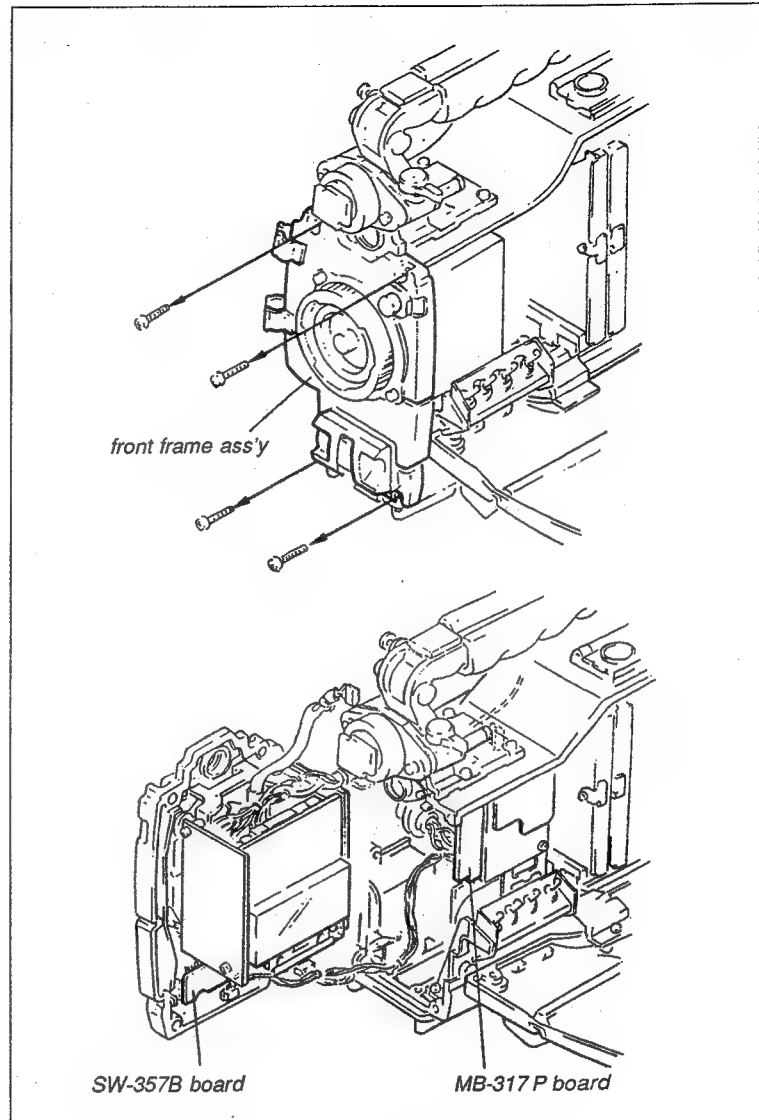


S/N; 41954 through 43999

4-1. REPLACEMENT OF THE CCD UNIT

Replacement procedure:

- (1) Remove the Viewfinder.
- (2) Remove the panels. (Refer to Section 3-1.)
- (3) Remove the four screws fixing the Front Frame Ass'y to the unit.
- (4) Disconnect the connectors CN1 and CN2 on the SW-357B Board and CN51, CN52, CN53, CN55, CN57, CN62 on the MB-317AP Board as shown in the figure.
- (5) Assemble the CCD Unit by reversing the steps (1) to (4)



S/N; 44001 and higher

4-1. REPLACEMENT OF THE CCD UNIT

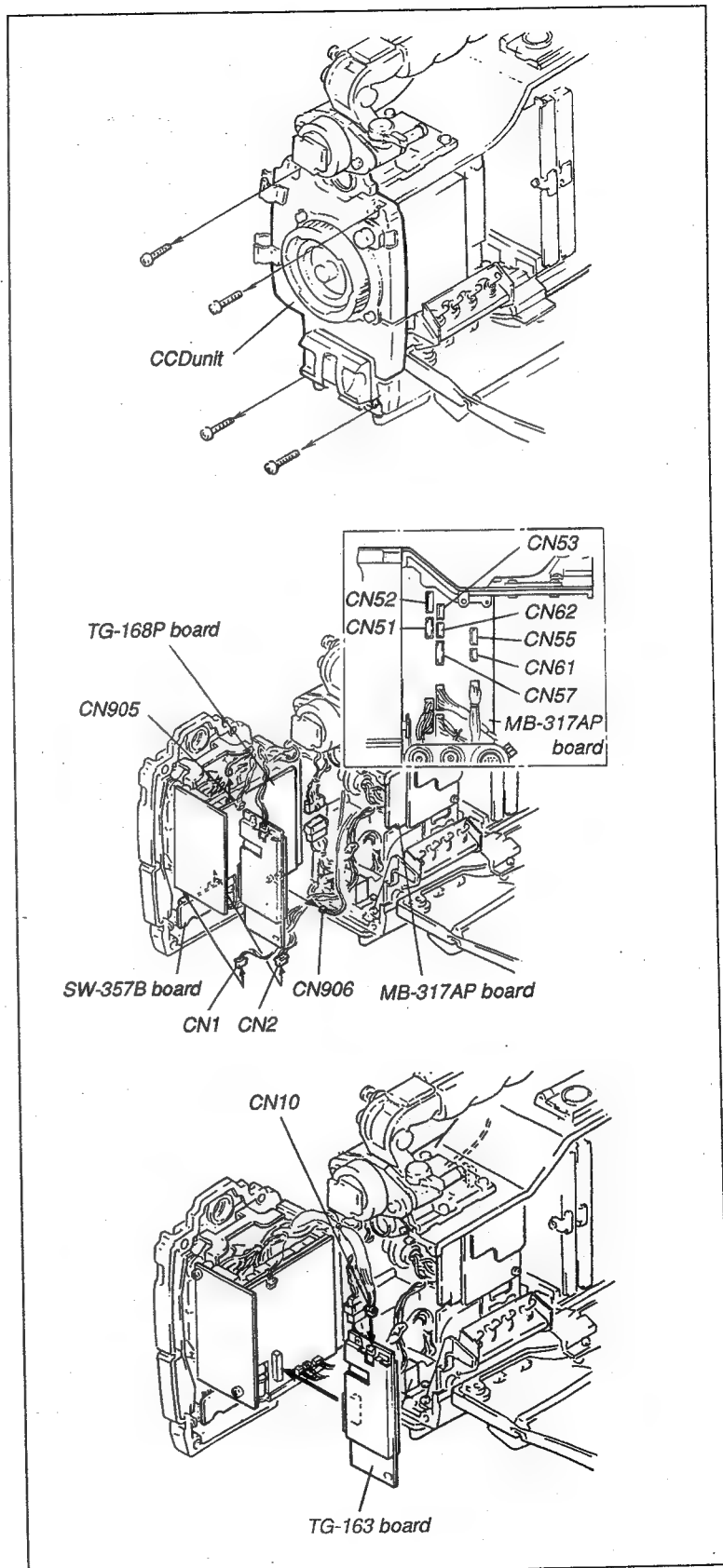
Replacement procedure:

- (1) Remove the viewfinder.
- (2) Remove the cabinet.
(Refer to Section 3-1. Removal of the cabinet.)
- (3) Remove the four screws fixing the CCD unit to the unit.
- (4) Remove the CCD unit from the unit, and remove the following connectors.
 - CN1, CN2/SW-357B Board
 - CN51, CN52, CN53 CN55, CN57, CN61, CN62/MB-317AP Board
- (5) Replace the CCD unit.

(NOTE) The CCD unit (Sony part No. A-8274-890-A: BVW-300AP) supplied as service parts is not connected to the TG-163 Board. Before installing, firstly connect the supplied TG-163 Board CN10, and then connect the board to the CCD unit, as shown in the figure.

When replacing the CCD unit with a new one, always replace the TG-163 Board as well.

- (6) Install in the reverse order of removal.

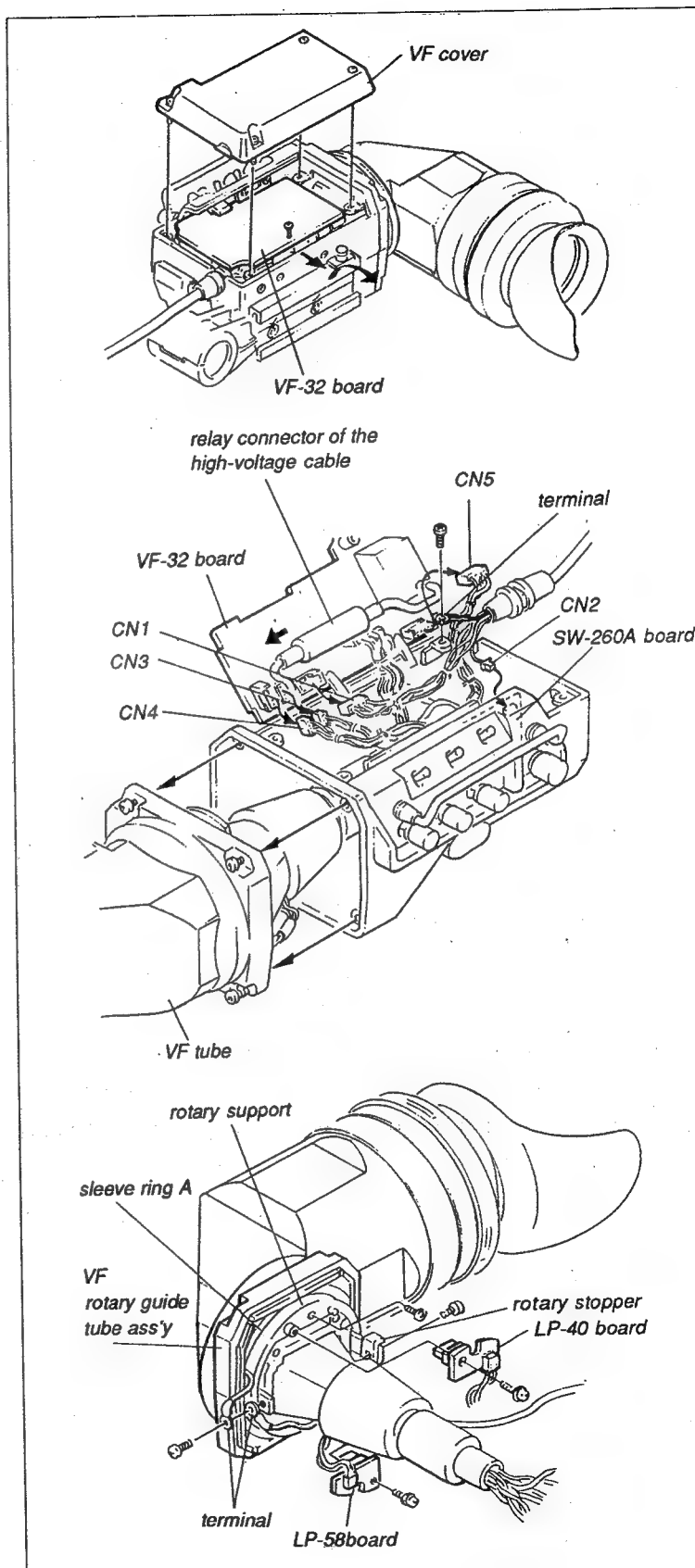


S/N; 41954 through 43999

4-2. REPLACEMENT OF THE CRT ASS'Y

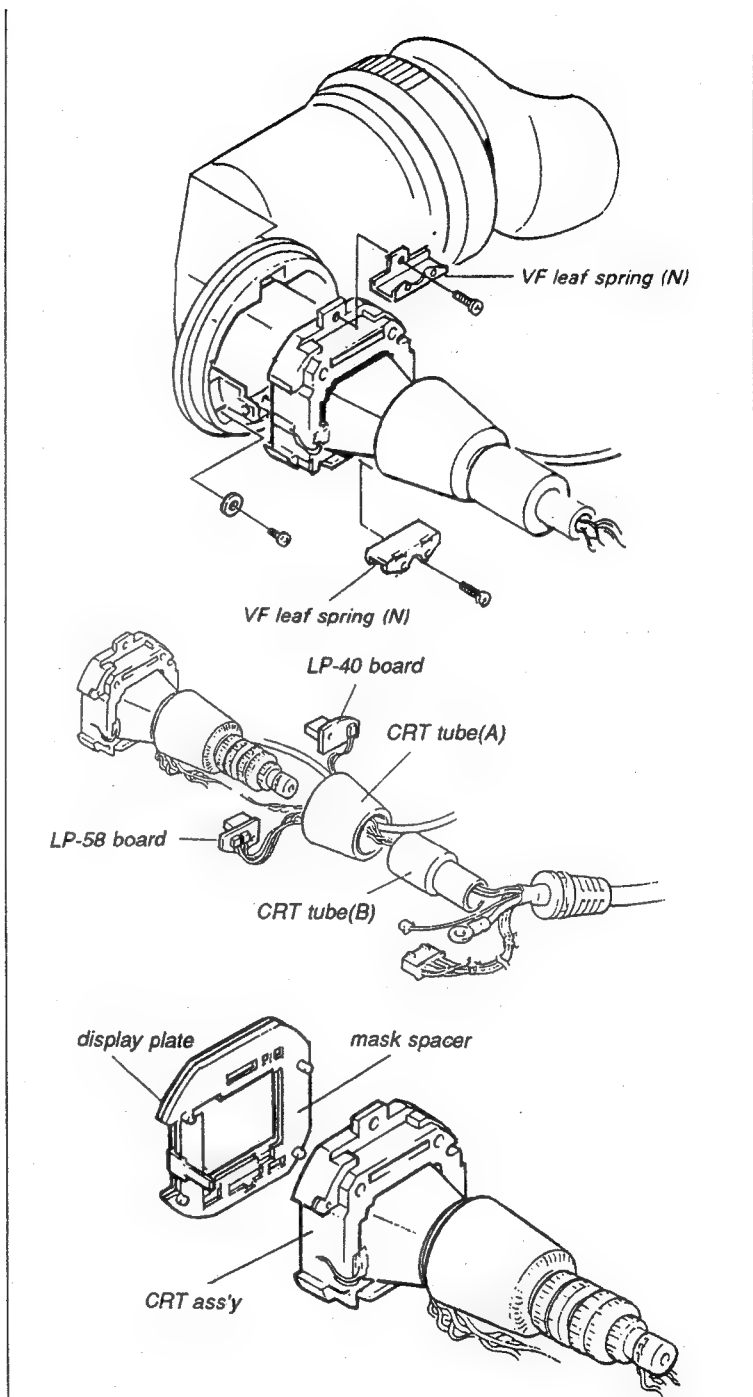
Replacement procedure:

- (1) Loosen the four fixing screws and remove the VF Cover.
- (2) Loosen the screws fixing the VF-32 Board, and open the VF-32 Board while moving it in the direction of the arrows as shown in the figure.
- (3) Disconnect the connectors CN1, CN3, CN4, CN5 on the VF-32 Board and disconnect CN2 on the SW-260A board. Remove the screw fixing the terminal. Disconnect the relay connector of the High-voltage Cable.
- (4) Loosen the four fixing screws and remove the VF Tube together with the VF cable from the VF Unit.
- (5) Remove the two screws fixing the LP-40 and LP-58 Boards.
- (6) Remove the two screws fixing the Rotary Support.
- (7) Remove the two screws fixing the Rotary Stopper and two terminals. Then remove the Rotary Support and Sleeve Ring A and VF Rotary Guide Tube Ass'y.



- (8) Remove the two screws fixing the VF Leaf Spring (N) and the screw fixing the plate washer. Then pull out the CRT Assembly.
- (9) Remove the CRT Tube (A) and (B) and remove the LP-40 and LP-58 Boards.
- (10) Peel away the Mask Spacer with Display plate from the CRT Ass'y.
- (11) Put the Mask Spacer with Display plate which removed from the old CRT Ass'y on the new CRT Ass'y with an adhesive tape.
- (12) Assemble the CRT Ass'y by reversing the steps for removal.

(NOTE) When installing the CRT Ass'y, be careful of arrangement of harnesses. Wrong arrangement damages the harness when the Viewfinder is in use. Connect the relay connector of the High-voltage Cable tightly.

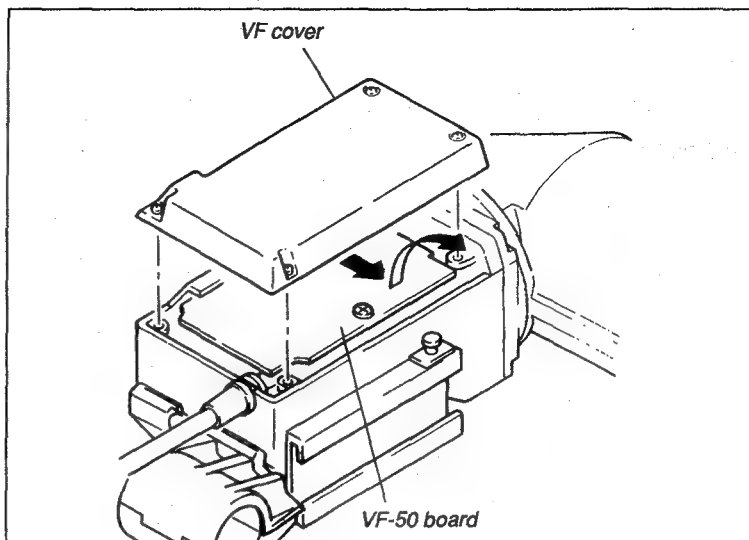


S/N; 44001 and higher

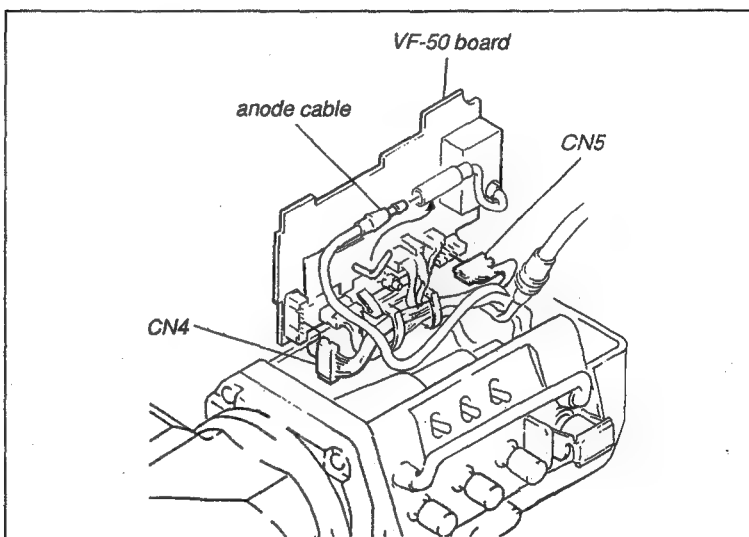
4-2. REPLACEMENT OF THE CRT ASS'Y

Replacement procedure:

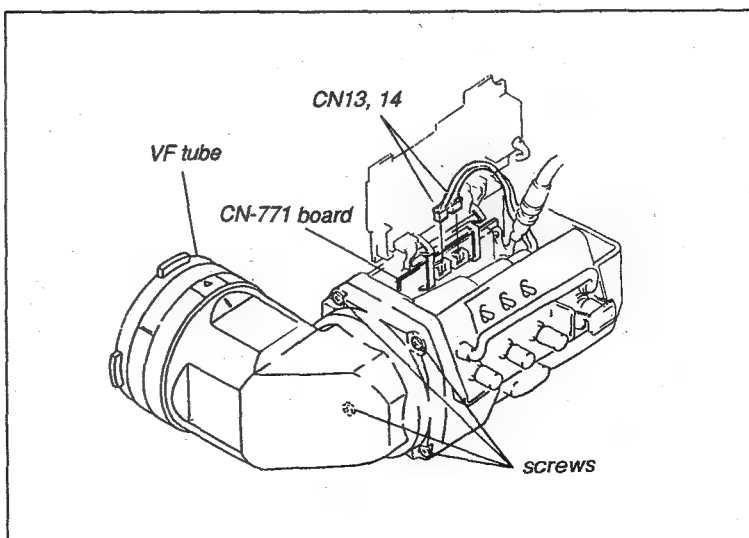
- (1) Loosen the four screws, and remove the VF cover.
- (2) Loosen the screw fixing the VF-50 Board, and open the Board while moving it in the direction of the arrow.



- (3) Disconnect connectors CN4, CN5 and the anode cable from the VF-50 Board.



- (4) Disconnect connectors CN13 and CN14 from the CN-771 Board.
- (5) Loosen the four screws shown in the figure, and remove the VF Tube from the VF unit.

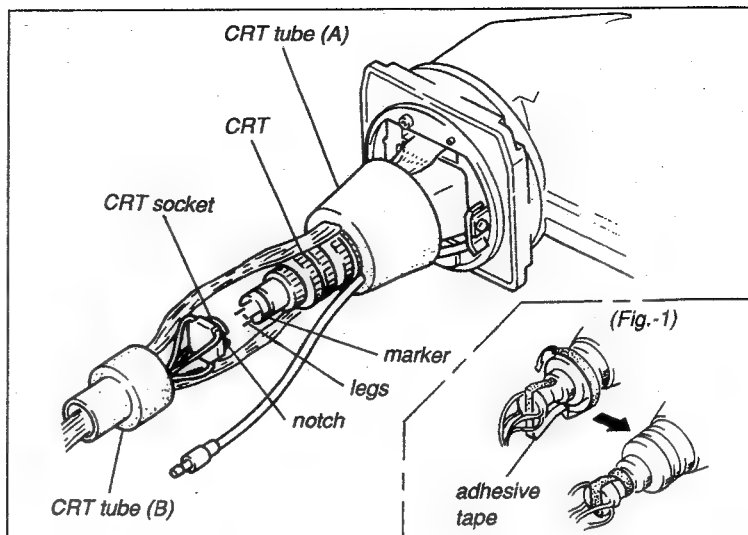


- (6) Remove the CRT tubes (A) and (B), and remove the CRT socket form the CRT.

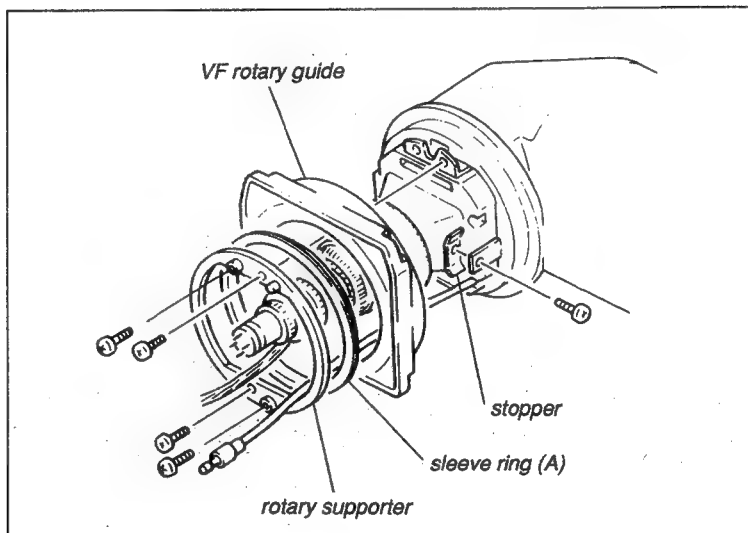
(NOTE) When installing the CRT socket, adjust the CRT marker to the notch of the CRT socket. Be careful not to bend the four legs of the CRT.

After installing the CRT socket, fasten by winding adhesive tape around the neck part and socket part.

(Refer to Fig. -1.)

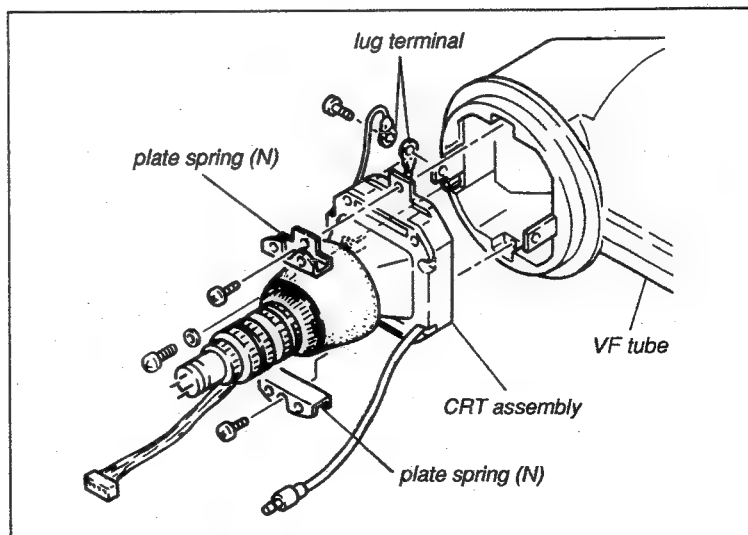


- (7) Remove the screw and the stopper. Remove the four screws, and remove the Rotary Support, Sleeve Ring (A) and VF Rotary Guide.

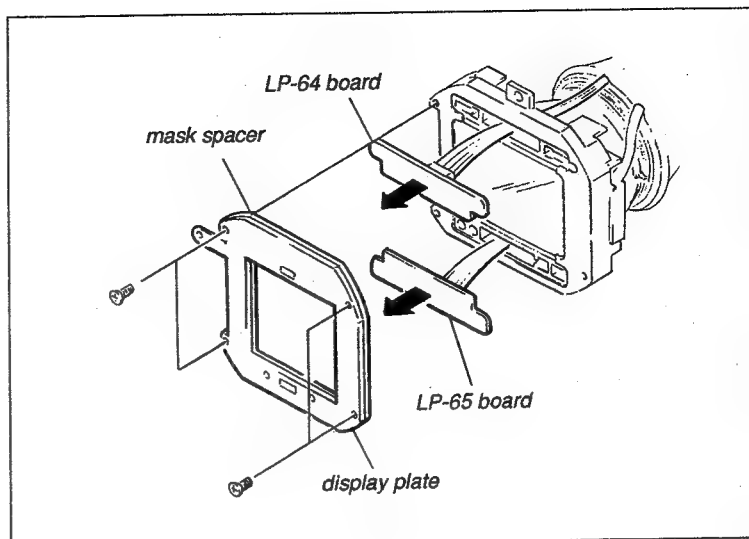


- (8) Remove each screw fixing the lug terminal and Display Plate.

- (9) Remove the two Plate Springs (N), and remove the CRT assembly from the VF tube.



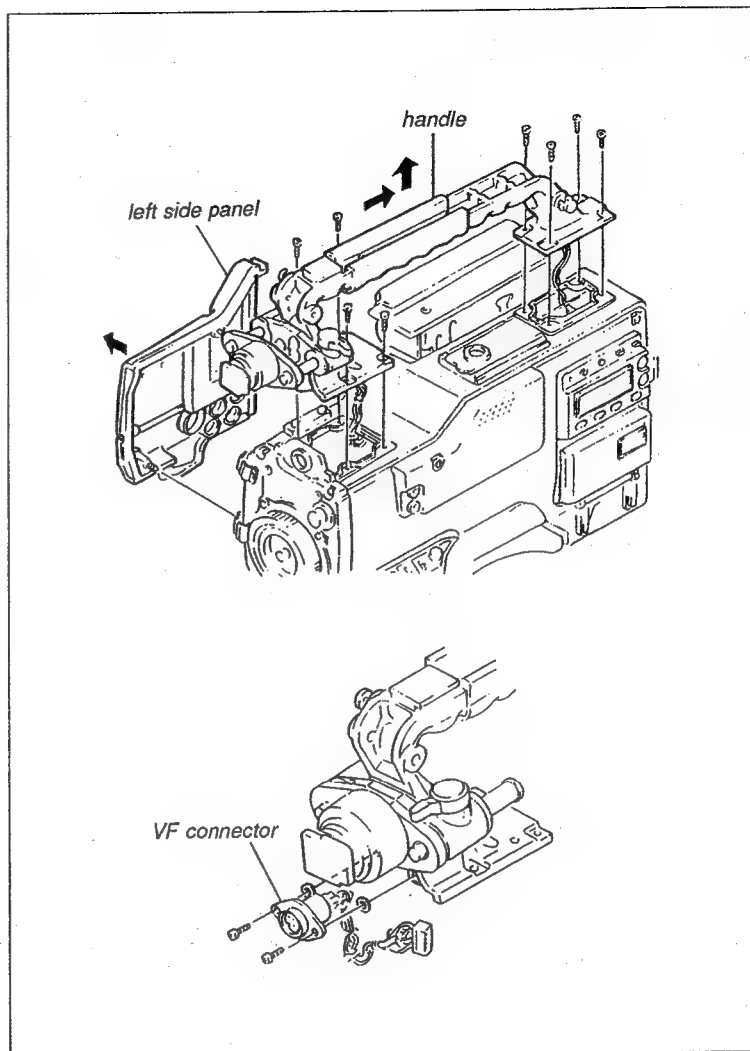
- (NOTE) When installing, pay full attention to the arrangement of the harness.
(Refer to 3-17. How to Arrange the VF Harness.)
If it is incorrectly arranged, the harness may easily break, etc. when using the VF.
Insert the anode cable relay connector until it locks.



4-3. REPLACEMENT OF THE VF CONNECTOR

Replacement procedure:

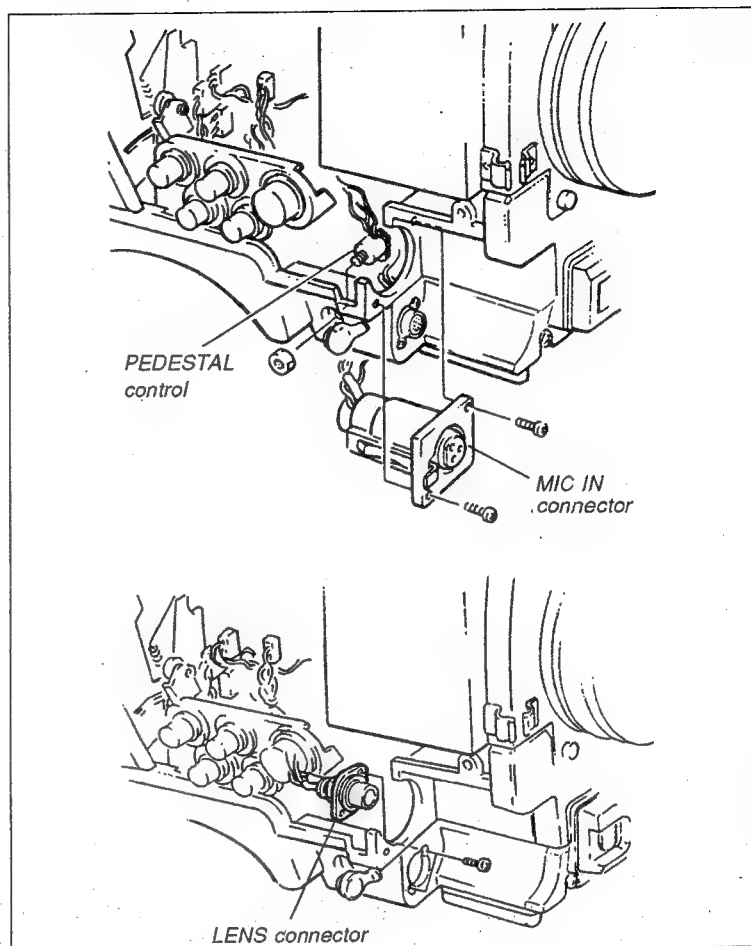
- (1) Open the Cassette-up Compartment Lid (put the unit into EJECT mode), remove the left side panel.
- (2) Move the Viewfinder forwards.
- (3) Remove the fixing screws shown in the figure and remove the handle.
- (4) Remove the two screws fixing the VF connector onto the handle and disconnect the CN50 on the MB-317AP Board, then remove the VF connector with the harnesses.
- (5) Assemble the VF connector by reversing steps for removal.



4-4. REPLACEMENT OF THE LENS CONNECTOR

Replacement procedure:

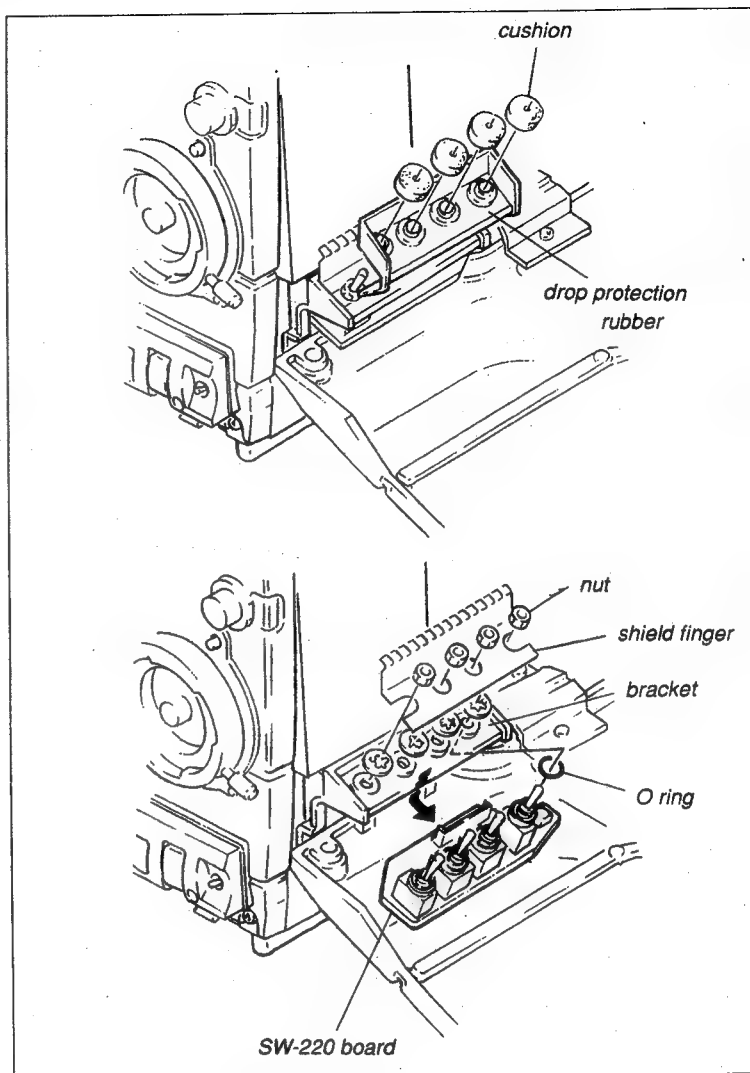
- (1) Open the Cassette-up Compartment Lid (put the unit into EJECT mode), remove the left side panel.
- (2) Remove the two fixing screws and disconnect the CN25 on the MB-317AP Board, and then remove the MIC IN connector.
- (3) Disconnect the CN22 on the MB-317AP Board and remove the PEDESTAL control.
- (4) Remove the two fixing screws and disconnect the CN58 on the MB-317AP Board, and then remove the LENS connector.
- (5) Assemble the new LENS connector by reversing steps for removal.



4-5. REPLACEMENT OF THE FUNCTION SWITCH

Replacement procedure:

- (1) Open the right side panel.
- (2) Remove the cushions of each switch.
- (3) Remove the Drop Protection Rubber.
- (4) Remove the nuts fixing the switches by the nut driver, and remove the Shield Finger.
- (5) Remove the SW-220 Board in the directions of the arrow in the figure.
- (6) Remove the defective switch from the SW-220 Board and replace the new switch.
- (7) Confirm that the O Ring is installed between each switch and the bracket, then, assemble the switch by reversing steps for removal. (O Ring is supplied with switch.)



4-6. REPLACEMENT OF THE DRUM ASSEMBLY

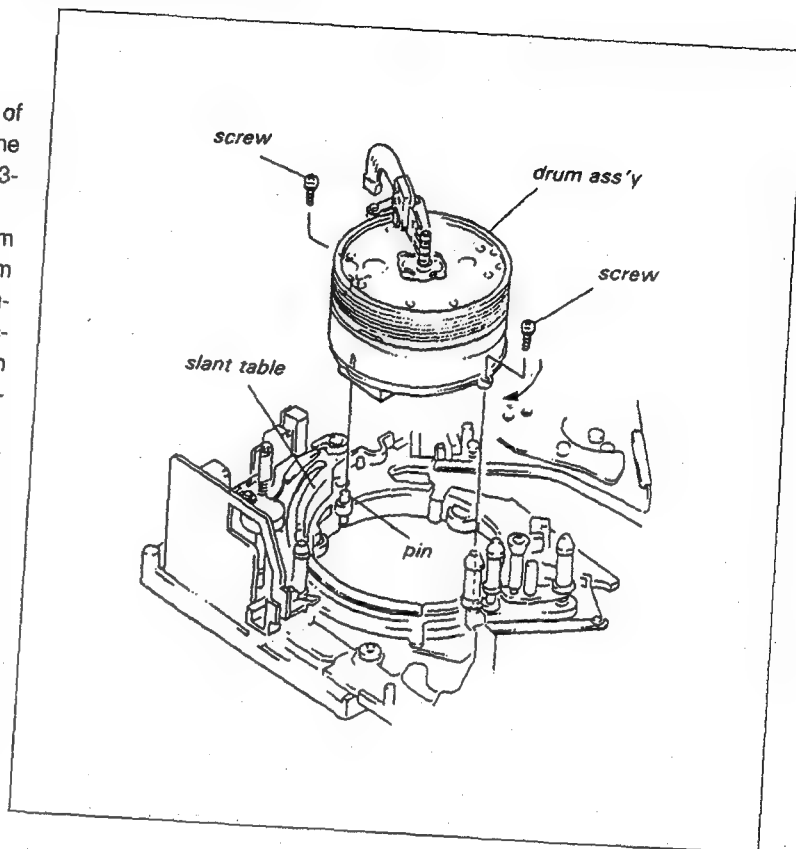
- When replacing the Drum Assembly, careful not to touch the Video Head.

Tool: Tweezers

Mode: EJECT

Replacement procedure:

- (1) Disconnect the flexible board (FL-54 Board) of the Slip Ring which is connected to CN5 on the TB-5 Board with tweezers. (Refer to Section 3-9.)
- (2) Remove the two fixing screws of the Drum Assembly and remove the Drum Assembly from the unit. When removing, raise the Drum Assembly straightly up so that disconnect the connectors CN41 and CN42 at the bottom of the drum which are inserted into the mother board (MB-317AP Board).
- (3) Install the new Drum Assembly in the unit so that the Slant Table Pin is installed into the hole of the new Drum Assembly.
- (4) Move the drum ass'y in the direction of the arrow and tighten the fixing screws at the Reel Table side. Then tighten the fixing screw at the CTL Head side.
- (5) Insert and lock the flexible board (FL-54 Board) of the slip Ring into connector CN5 on the TB-5 Board with tweezers. (Refer to Section 3-9.)
- (6) After replacement, perform the adjustments in Section 4-42.



4-7. REPLACEMENT OF THE UPPER DRUM ASSEMBLY

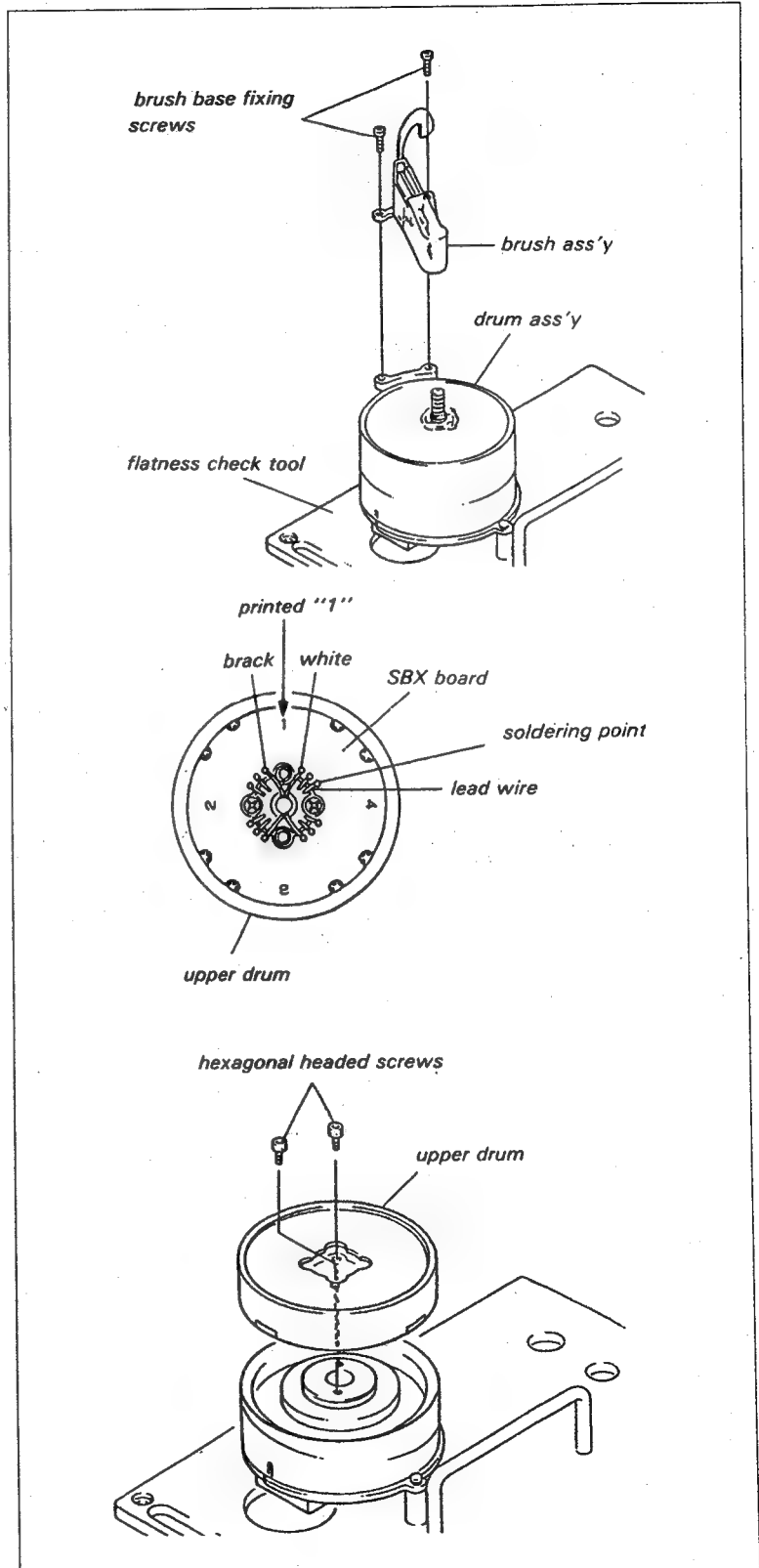
- When replacing the Upper Drum Assembly, be careful not to touch the Video Head.

Tool: Flatness check tool
Drum eccentricity gauge (3)
Drum eccentricity gauge (2)
Drum eccentricity gauge (6)
Tweezers
L-shaped hexagonal wrench (across flat has 1.5mm)

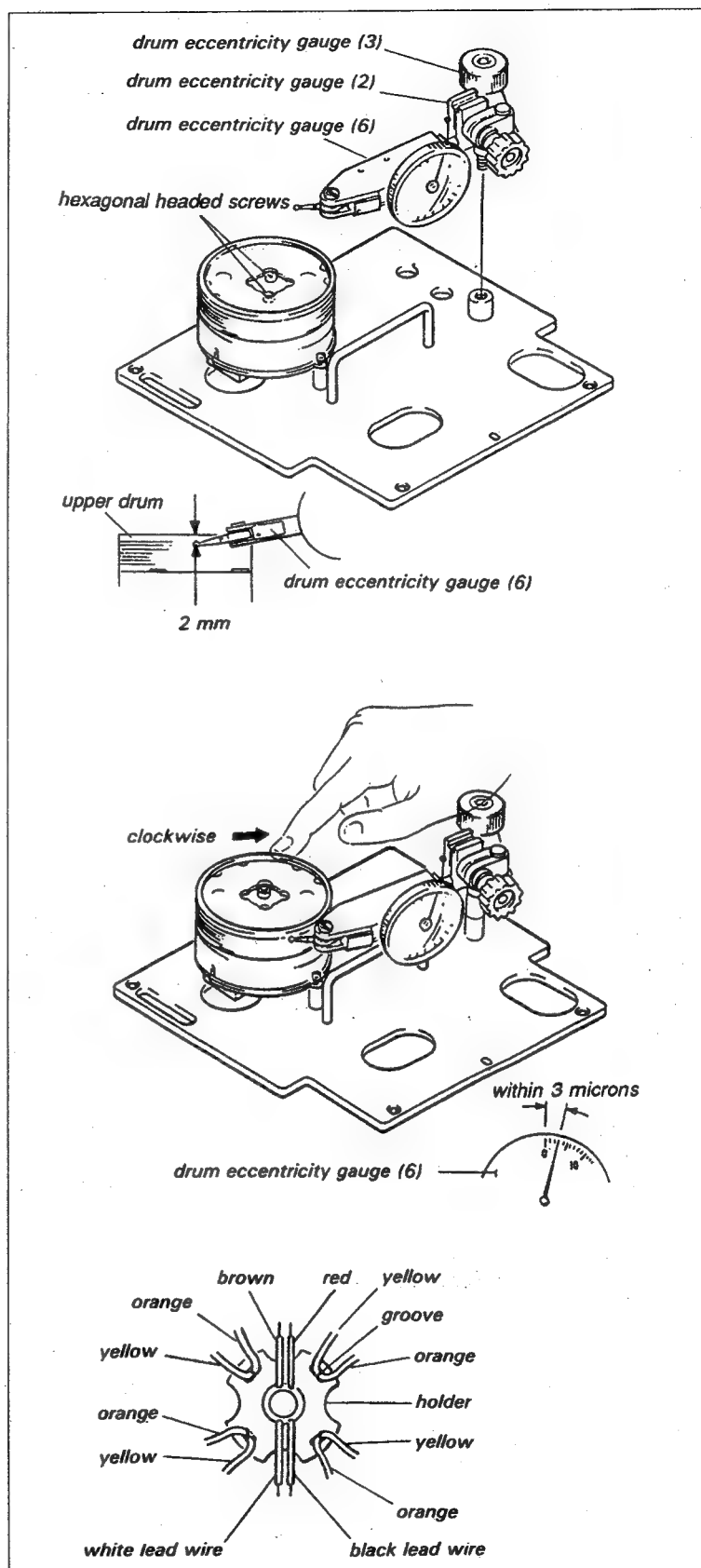
Mode: EJECT

Replacement procedure:

- (1) Remove the Drum Assembly from the unit as described in Steps (1) and (2) in Section 4-6.
- (2) Install the Drum Assembly on the flatness check tool.
- (3) Remove the two brush base fixing screws and remove the Brush Assembly from the Drum Assembly.
- (4) Remove the two hexagonal headed screws from the Upper Drum Assembly with the L-shaped hexagonal wrench, then remove the Upper Drum Assembly from the Drum Assembly.
- (5) Remove the Slip Ring Assembly from the removed Upper Drum Assembly as described in Section 4-8.
- (6) Put the new Upper Drum Assembly on the flange.
- (7) Thread the hexagonal headed screws on the new Upper Drum Assembly to the flange snugly but do not tighten.



- (8) Assemble the drum eccentricity gauges (3), (2), (6), and install them on the flatness check tool.
- (9) Adjust the position of gauge so that the tip probe is positioned at the point about 2mm from the top edge of the Upper Drum.
- (10) Turn the Upper Drum Assembly slowly clockwise and confirm that the pointer deflection of the gauge is within 3 microns during one complete turn.
If the specification is satisfied, perform Step (12) and later. If not, Perform Step (11) and later.
- (11) To satisfy the specification, adjust the position of the upper drum assembly by moving it manually.
- (12) After adjustment, alternately tighten the two hexagonal headed screws.
- (13) Confirm that the specification is satisfied once again.
- (14) Install the Slip Ring Assembly removed in Step (5) as described in Section 4-8.
- (15) Install the Brush Assembly.
- (16) Perform the Brush Position Adjustment in Section 6-16-1.
- (17) Remove the Drum Assembly from the flatness check tool.
- (18) Perform steps (3) through (6) in Section 4-6.



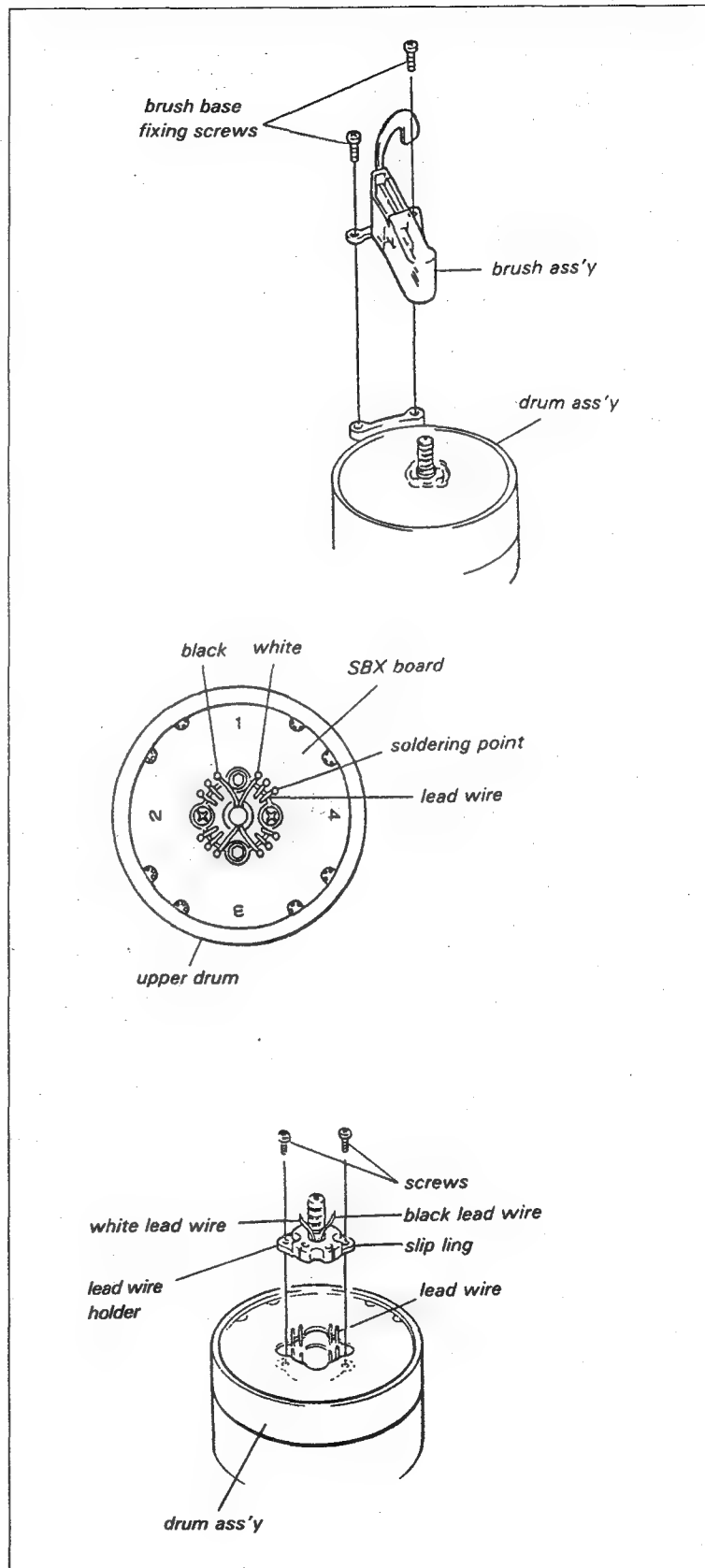
4-8. REPLACEMENT OF THE SLIP RING ASSEMBLY

Tool: Tweezers

Mode: EJECT

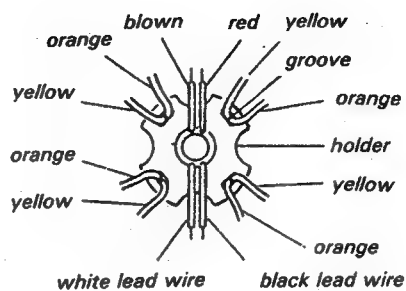
Replacement procedure:

- (1) Disconnect the flexible board (FL-54 Board) of the slip ring which is connected to CN5 on the TB-5 Board with tweezers. (Refer to Section 3-9.)
- (2) Remove the two brush base fixing screws and remove the Brush Assembly from the unit.
- (3) Desolder the four lead wires of the Slip Ring from the SBX Board of the Upper Drum Assembly.
- (4) Remove the other eight lead wires from the lead wire holder.
- (5) Remove the two screws of the Slip Ring, then remove the Slip Ring from the unit.
- (6) Arrange the black and white lead wires of the new Slip Ring so that they are facing the side of the SBX Board with the silk screen printed "1", and put on the Drum Assembly. At that time, insert the eight lead wires removed in Step (4) into the four grooves of the lead wire holder as shown in the figure.
- (7) Install the Slip Ring onto the Drum Assembly with the two screws.



4. REPAIR ASSEMBLY OF THE 44A AND 44B DADTC IIIIIIIIIII

- (8) Solder the twelve lead wires on the SBX Board as shown in the figure.
- (9) Install the Brush Assembly.
- (10) Perform the Brush Position Adjustment in Section 6-16-1.
- (11) Install and lock the flexible board (FL-54 Board) of the Slip Ring into CN5 on the TB-5 Board with tweezers. (Refer to section 3-9.)

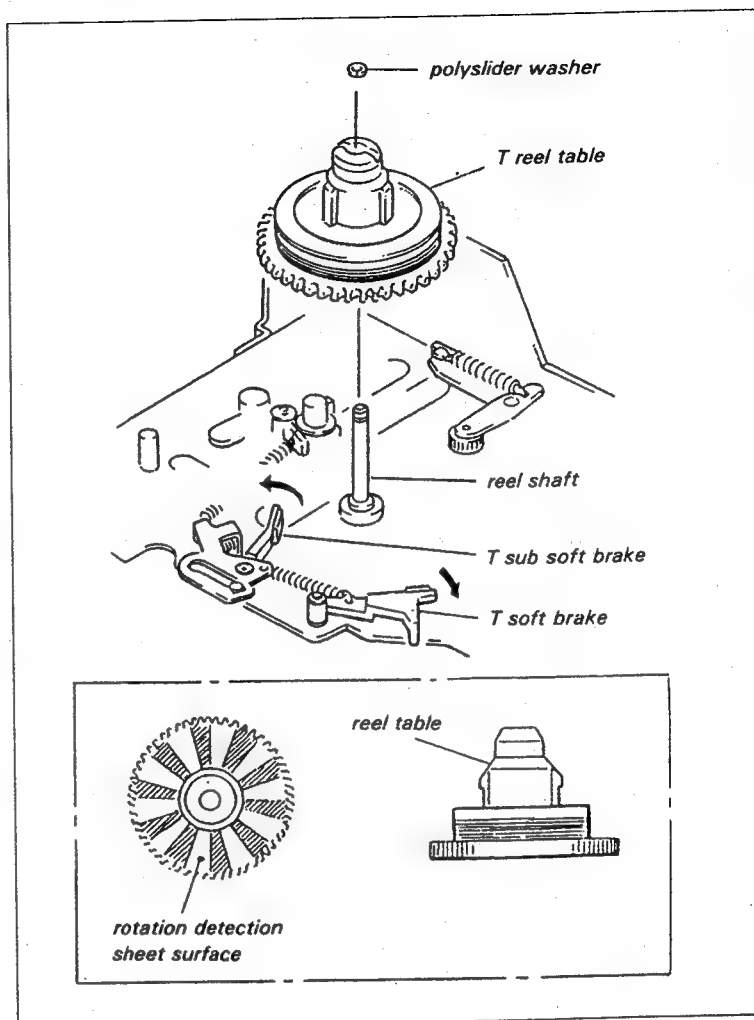


4-9. REPLACEMENT OF THE TAKE-UP SIDE REEL TABLE

Mode: EJECT

Replacement:

- (1) Remove the Brake Slider referring to Section 4-17.
- (2) Remove the polyslider washer at the top of the T Reel Table.
- (3) Release the pressures of the T Sub Soft Brake and T Soft Brake from the T Reel Table while pressing them in the direction of the arrows, and remove the T Reel Table from the unit.
- (4) Clean the reel shaft with a cleaning piece moistened with cleaning fluid.
- (5) Clean the Rotation Detection Sheet surface of the new T Reel Table and the reel table's outer circumference with a cleaning piece moistened with cleaning fluid.
- (6) Release the T Sub Soft Brake and T Soft Brake as in Step (3), insert the T Reel Table onto the Reel Shaft, and fasten it with the 1.2mm diameter polyslider washer.
- (7) While releasing the T Sub Soft Brake, rotate the T Reel Table by hand to check that it rotates smoothly.
- (8) Install the Brake Slider referring to Section 4-17.
- (9) After replacement, while releasing the T Soft Brake and T Sub Soft Brake, rotate the T Reel Table, and check that it rotates smoothly.

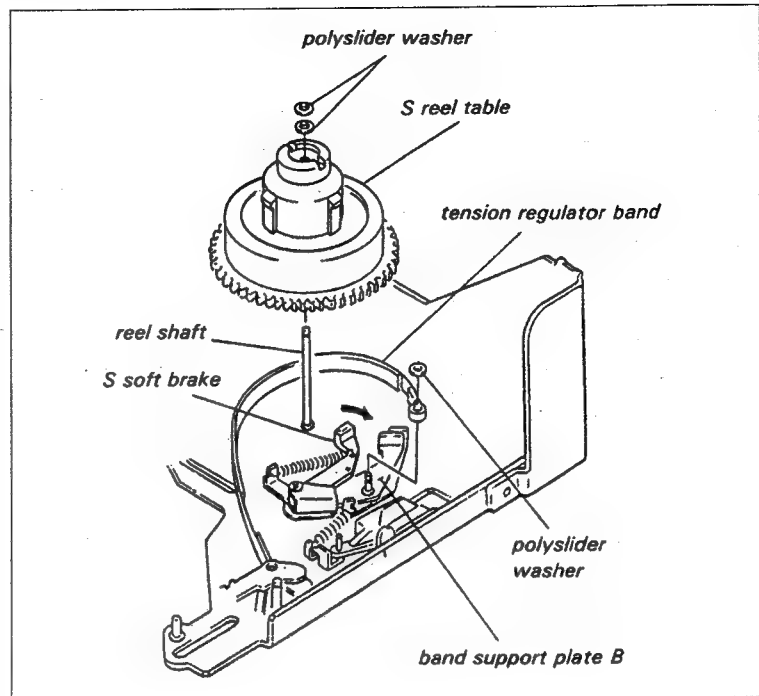


4-10. REPLACEMENT OF THE SUPPLY SIDE REEL TABLE

Mode: EJECT

Replacement procedure:

- (1) Remove the polyslider washer (shown in the figure) fixing the Tension Regulator Band.
- (2) Remove the polyslider washer at the top of the S Reel Table.
- (3) Release the pressure of the S Soft Brake from the S Reel Table while pressing it in the direction of the arrow, and remove the S Reel Table from the unit.
- (4) Clean the reel shaft with a cleaning piece moistened with cleaning fluid.
- (5) Clean the Rotation Detection Sheet surface of the a new S Reel Table and the reel table's outer circumference with a cleaning piece moistened with cleaning fluid.
- (6) Release the S Soft Brake as in Step (3), insert the S Reel Table onto the reel shaft, and fasten it with the 2mm diameter polyslider washer and the 1.2mm diameter polyslider washer.
- (7) Insert the Tension Regulator Band onto the shaft of the Band Support B Assembly and fasten it with the 1.2mm diameter polyslider washer.
- (8) After replacement, while releasing the S Soft Brake, rotate the S Reel Table by hand to check that it rotates smoothly.
- (9) After replacement, perform the adjustments in Section 4-42.



4-11. REPLACEMENT OF THE TAKE-UP SIDE DRIVING GEAR

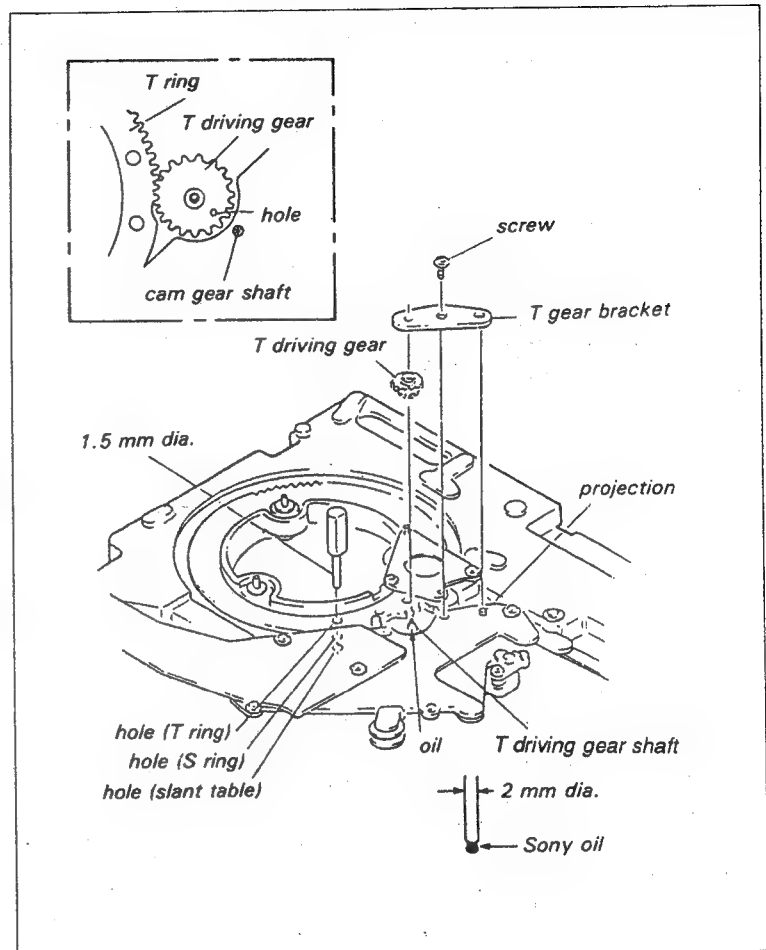
- When replacing the T Driving Gear, remove the Mechanical Deck Block from the unit.
(Refer to Section 3-12.)

Tool: 1.5mm diameter rod

Mode: EJECT

Replacement procedure:

- (1) Remove the Mechanical Deck Block from the unit. (Refer to Section 3-12.)
- (2) Remove a fixing screw of the T Gear Bracket and remove the T Gear Bracket and T Driving Gear from the back of the Mechanical Deck Block.
- (3) Clean the T Driving Gear Shaft with a cleaning piece moistened with cleaning fluid.
- (4) Apply a half drop of Sony oil on the above shaft.
(One drop of Sony oil is about amount that remains on the tip of 2mm diameter rod dipped in oil.)
- (5) Align the three holes (1.5mm dia.) of the Threading Ring (take-up side), Threading Ring (supply side), and Slant Table, then pass a rod (1.5mm dia.) through the holes.
- (6) Insert the T Driving Gear onto the shaft so that the positional relationship between the T Driving Gear hole and Cam Gear Shaft are aligned as shown in the detail figure.
- (7) Install the T Gear Bracket with a fixing screw.
- (8) Repeat threading and unthreading two or three times and check that they can be done smoothly.



4-12. REPLACEMENT OF THE SUPPLY SIDE DRIVING GEAR

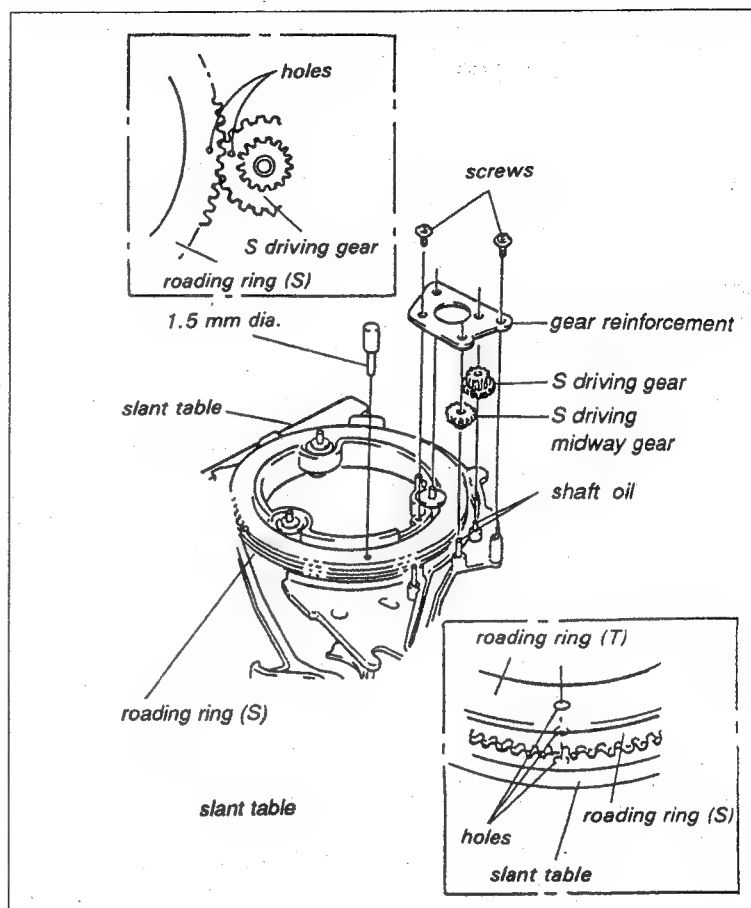
- When replacing the S Driving Gear, remove the Mechanical Deck Block from the unit.
(Refer to Section 3-12.)

Tool: 1.5mm diameter rod

Mode: EJECT

Replacement procedure:

- (1) Remove the Mechanical Deck Block from the unit. (Refer to Section 3-12.)
- (2) Remove the two fixing screws of the Gear Reinforcement, and then remove the Gear Reinforcement, S Driving Midway Gear, and S Driving Gear from the back of the Mechanical Deck Block.
- (3) Clean the S Driving Midway Gear and S Driving Gear Shafts with a cleaning piece moistened with cleaning fluid.
- (4) Apply a half drop of Sony oil on the above two shafts.
- (5) Align the three holes (1.5mm dia.) of the Threading Ring (take-up side), Threading Ring (supply side), and Slant Table, then pass one rod (1.5mm dia.) through the holes.
- (6) Insert the S Driving Gear onto the shaft so that the positional relationship between the S Driving Gear hole and Threading Ring (supply side) hole are aligned as shown in the detail figure.
- (7) Insert the S Driving Midway Gear and install the Gear Reinforcement with two fixing screws.
- (8) Repeat threading and unthreading two or three times and check that they can be done smoothly.

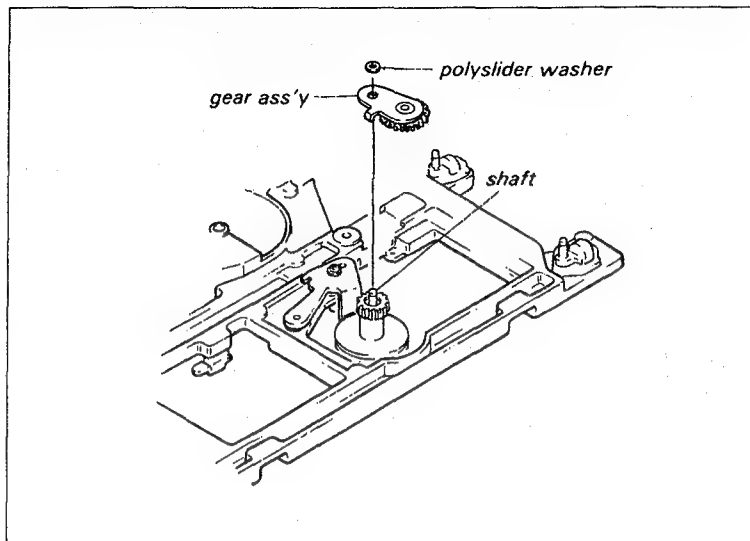


4-13. REPLACEMENT OF THE GEAR ASSEMBLY

Mode: EJECT

Replacement procedure:

- (1) Remove the polyslider washer at the top of the Gear Assembly.
- (2) Clean the shaft of the Gear Assembly with a cleaning piece moistened with cleaning fluid.
- (3) Insert the new Gear Assembly onto the shaft, push a polyslider washer onto the shaft, and fasten the Gear Assembly.
- (4) Perform the PLAY, F.FWD, and REW operations two or three times and check that they can be done smoothly.
- (5) After replacement, perform the Gear Assembly Position Adjustment in Section 5-1.



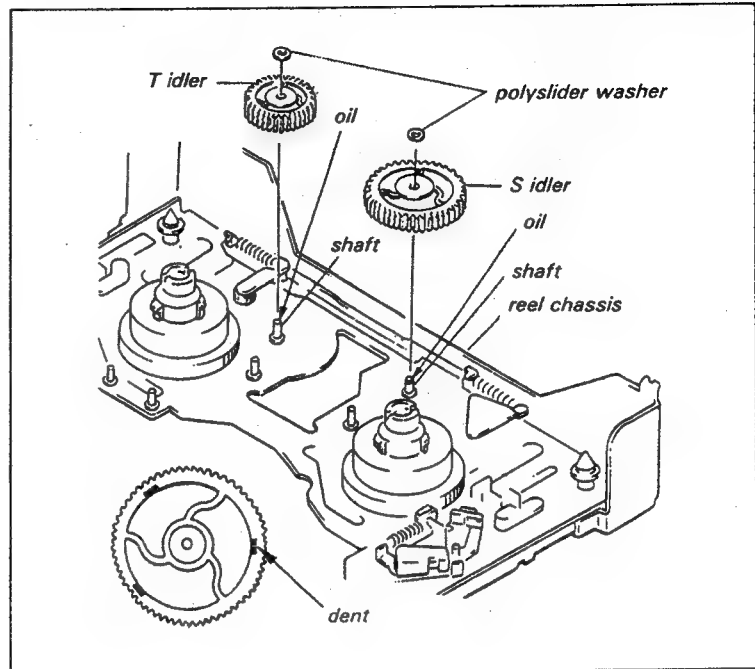
4-14. REPLACEMENT OF THE SUPPLY/TAKE-UP SIDE IDLER

- Since the S and T Idlers are replaced in the same manner, only replacement of the S Idler is described below.

Mode: EJECT

Replacement procedure:

- (1) Remove the polyslider washer and remove the S Side Idler from the unit.
- (2) Clean the Reel Shaft with a cleaning piece moistened with cleaning fluid.
- (3) Apply a 1/4 drop of Sony oil on the shaft.
- (4) As shown in the figure, install the S Idler in the unit with the S Idler surface's three dents faced to the reel chassis (the lower position).
- (5) Fasten the S Idler with the 1.2mm diameter polyslider washer.



4-15. REPLACEMENT OF THE TENSION REGULATOR BAND

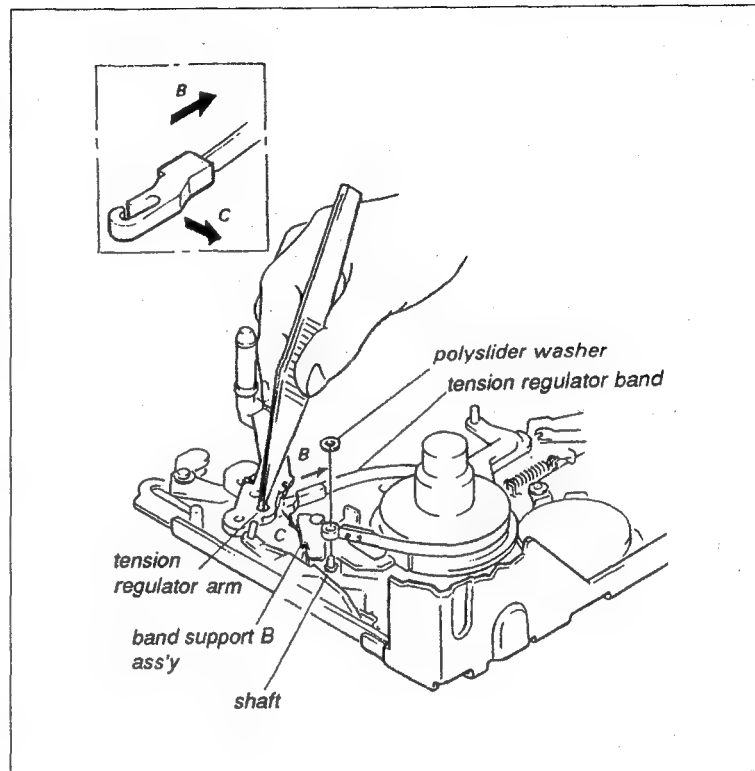
- When replacing the Tension Regulator Band, be careful not to touch or bend the band felt portion.

Tool: Tweezers

Mode: Threading end

Replacement procedure:

- (1) Put the unit into the threading end mode. (Refer to the Precautions when Replacing Parts.)
- (2) Remove the polyslider washer shown in the figure.
- (3) Push the Arm Hook of the Tension Regulator Band in the opposite direction of the arrow B.
- (4) Insert tweezers into the hole of the Tension Regulator Arm shown in the figure, and hold the hook and push it in the direction of the arrow C, then remove the Tension Regulator Band.
- (5) Insert the hook of a new Tension Regulator Band into the lower portion of the Tension Arm in the direction indicated by the figure and push the hook in the opposite direction of the arrow C to lock it to the pin.
- (6) Pull the hook of the Tension Regulator band in the direction of the arrow B.
- (7) Taking care not to bend the Tension Regulator Band, wind it around the S Reel.
- (8) Insert another hook of the Tension Regulator Band onto the shaft of the Band Support B Assembly and fasten it with 1.2mm diameter polyslider washer onto the shaft.
- (9) After replacement, perform the adjustments in Section 4-42.



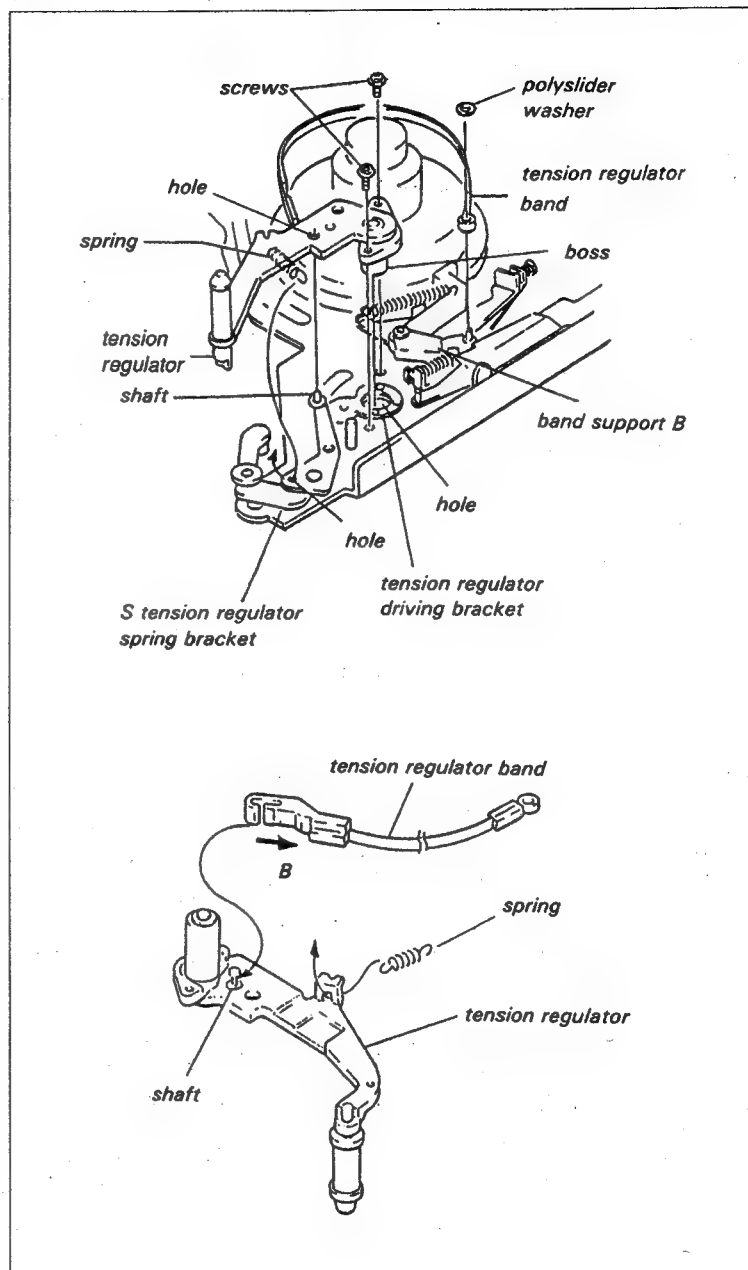
4-16. REPLACEMENT OF THE TENSION REGULATOR

- When replacing the Tension Regulator, remove the Tension Regulator Band from the unit. Be careful not to touch or bend the band felt portion.

Mode: EJECT

Replacement procedure:

- (1) Remove the polyslider washer fixing the Tension Regulator Band.
- (2) Remove the spring shown in the figure from the S Tension Regulator Spring Bracket.
- (3) Remove the two fixing screws of the Tension Regulator and remove the Tension Regulator from the unit.
- (4) Remove the spring (removed in Step (2)) from the removed Tension Regulator and install it on the new Tension Regulator in the direction as shown in the figure.
- (5) Remove the Tension Regulator Band from the removed Tension Regulator and install it on the new Tension Regulator in the direction shown in the figure. After installation, pull the band in the direction of the arrow B.
- (6) Align the hole of the Tension Regulator Driving Bracket with the reel chassis hole.
- (7) Insert the Tension Regulator Boss into the reel chassis hole. Adjust the Tension Regulator position so that the Driving Bracket Shaft is inserted into the illustrated hole of the Tension Regulator.
- (8) Install the Tension Regulator with the two screws.
- (9) Install the spring (removed in Step (2)) on the S Tension Regulator Spring bracket in the direction as shown in the figure.
- (10) Being careful not to bend the Tension Regulator Band, wind it around the S Reel.
- (11) Insert the other hook of the band onto the shaft of the Band Support B Assembly and insert the 1.2mm diameter polyslider washer onto the shaft.
- (12) After replacement, perform the adjustments in Section 4-42.

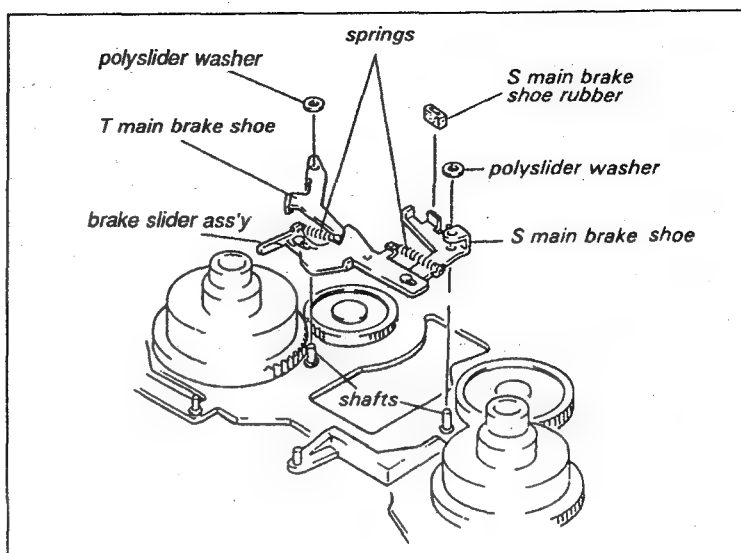


4-17. REPLACEMENT OF THE MAIN BRAKE SHOE

Mode: EJECT

Replacement procedure:

- (1) Remove the T or S Brake Shoe Rubber.
- (2) Install the new Brake Shoe Rubber.

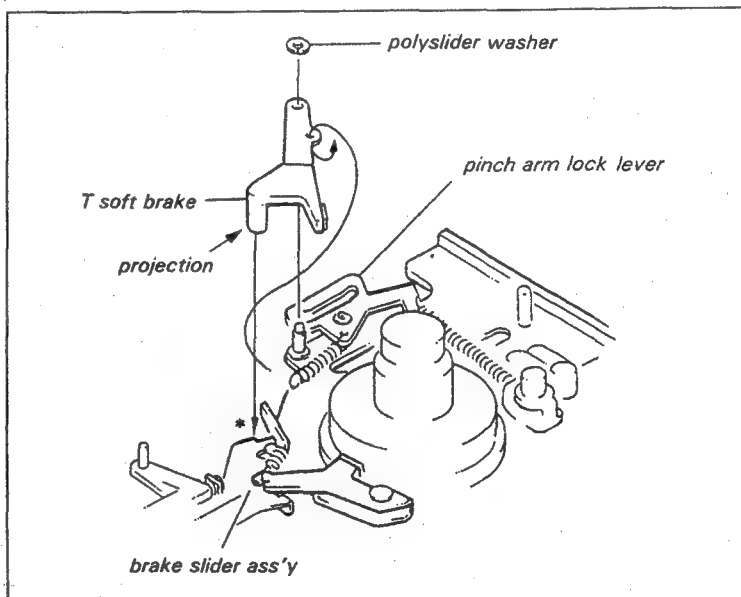


4-18. REPLACEMENT OF THE TAKE-UP SIDE SOFT BRAKE

Mode: EJECT

Replacement procedure:

- (1) Remove the spring from the Pinch Arm Lock Lever which is hooked to the T Soft Brake.
- (2) Remove the polyslider washer and remove the T Soft Brake from the unit.
- (3) Install the T Soft Brake to the unit so that the projection of the new T Soft Brake is positioned to the * marked portion of the Brake Slider Assembly, insert the 1.2mm diameter polyslider washer onto the shaft, and fasten the T Soft Brake.
- (4) Hook the spring of the Pinch Arm Lock Lever to the T Soft Brake.

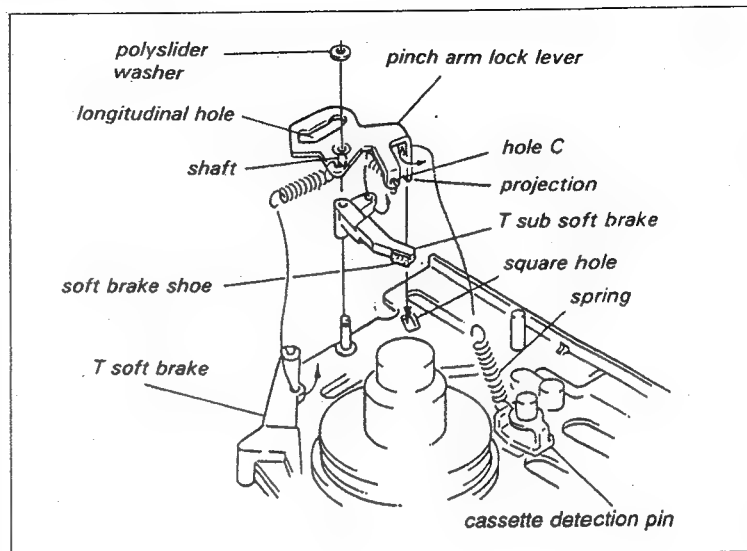


4-19. REPLACEMENT OF THE TAKE-UP SIDE SUB SOFT BRAKE

Mode: EJECT

Replacement procedure:

- (1) Remove the spring from the Pinch Arm Lock Lever which is hooked to the T Soft Brake.
- (2) Remove the spring from the Cassette Detection Pin which is hooked to the Pinch Arm Lock Lever.
- (3) Remove the polyslider washer fixing the Pinch Arm Lock Lever and remove the Lock Lever from the unit.
- (4) Remove the spring from the T Sub Soft Brake which is hooked on hole C of the Pinch Arm Lock Lever.
- (5) Remove the spring from the T Sub Soft Brake and hook it on the new T Sub Soft Brake in the direction as shown in the figure.
- (6) Insert the T Sub Soft Brake onto the shaft of the Pinch Arm Lock Lever and hook the spring as shown in the figure.
- (7) Install the Pinch Arm Lock Lever on the unit so that the projection of the Pinch Arm Lock Lever is inserted into the Square hole of the reel chassis, the T Sub Soft Brake Shoe touches the reel table, and the Pinch Arm Roller is inserted into the longitudinal hole of the Lock Lever.
- (8) Insert the 1.2mm diameter polyslider washer onto the shaft and fasten the Lock Lever.
- (9) Hook the spring which is removed in Steps (1) and (2).

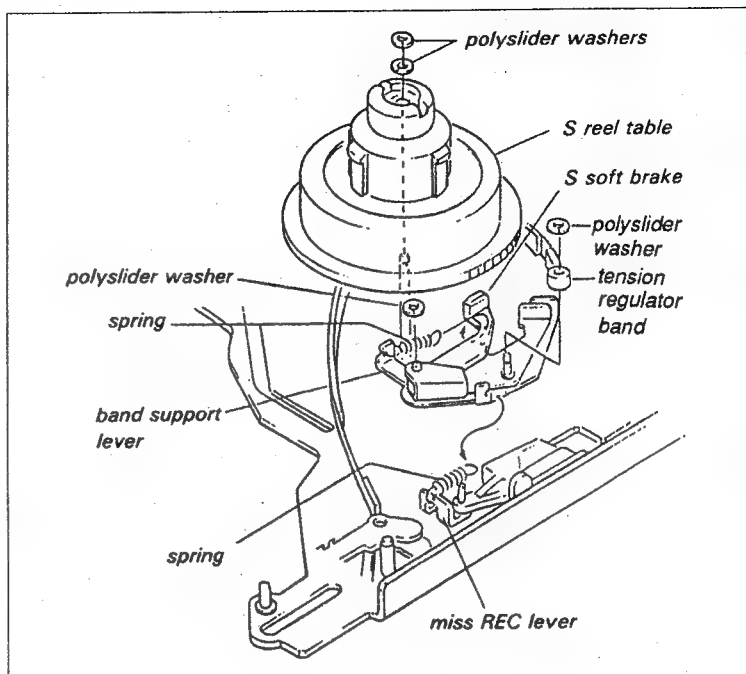


4-20. REPLACEMENT OF THE SUPPLY SIDE SOFT BRAKE

Mode: EJECT

Replacement procedure:

- (1) Remove the polyslider washer (shown in the figure) fixing the Tension Regulator Band.
- (2) Remove the polyslider washer at the top of the S Reel Table.
- (3) Remove the S Reel Table from the unit while releasing the pressure against the S Reel Table of the S Soft Brake.
- (4) Remove the spring from the Miss REC Lever B hooked on the Band Support Lever.
- (5) Remove the polyslider washer shown in the figure and remove the Band Support Lever from the unit.
- (6) Remove the spring from the S Soft Brake.
- (7) Install the new S Soft Brake and hook the spring removed in Step 4 in the direction as shown in the figure.
- (8) Assemble the S Soft Brake by reversing the Steps (1) through (5).



4-21. REPLACEMENT OF THE COMPONENT PARTS OF TAKE-UP SIDE BASE

- Replacement of the TG-7 (guide roller) on the T Base differs from replacement of the other components.
- Refer to Section 4-21-1 for replacement the TG-7, and refer to Section 4-21-2 for other components.

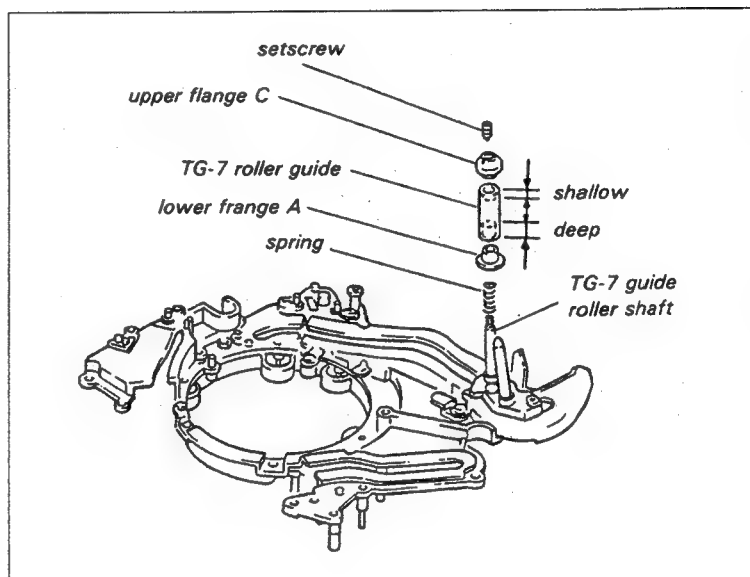
4-21-1. Replacement of the TG-7

Tool: Tape guide adjustment screwdriver

Mode: EJECT

Replacement procedure:

- (1) Loosen the setscrew at the top of the TG-7 with the tape guide adjustment screwdriver.
- (2) Remove the Upper Flange C.
- (3) Remove the TG-7 Roller Guide TG-7, the Lower flange A, and the compression spring.
- (4) Clean the TG-7 Guide Roller Shaft with a cleaning piece moistened with cleaning fluid.
- (5) Insert the compression spring removed in Step (3) onto the TG-7 Guide Roller Shaft.
- (6) Carefully insert the Lower Flange A and TG-7 Guide Roller onto the TG-7 Guide Roller Shaft in the direction as shown in the figure.
- (7) Install the Upper Flange C.
- (8) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
- (9) After replacement, perform the adjustments in Section 4-42.



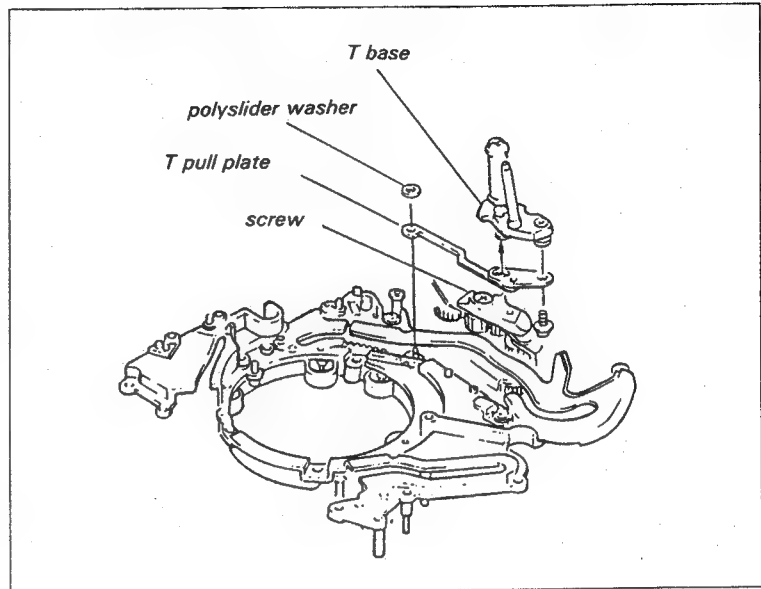
4-21-2. Replacement of the Component Parts of the Take-up Side Base

- For replacement of the TG-7 on the T Side Base, refer to Section 4-21-1.
- When replacing the components other than TG-7 on the T Side Base, remove the Drum from the unit once so as not to damage it.

Mode: Turn the screw shown in the figure so that the Take-up Side Base reaches the end of the Take-up Side Rail (I).

Replacement procedure:

- (1) Remove the Drum Assembly from the unit. (Refer to Section 4-6.)
- (2) Turn the screw and set the Take-up Side Base in the position described above.
- (3) Remove the Take-up Side Rail(I). (Refer to Section 4-43.)
- (4) Remove the polyslider washer fixing the Take-up Side Pull Plate and remove the Take-up Side Base from the unit.
- (5) Replace the faulty component which constitutes the Take-up Side Base.
- (6) Assemble the Take-up Side Base by reversing the Steps (1) through(4).
- (7) After replacement, perform the adjustments in Section 4-42.



4-22. REPLACEMENT OF THE COMPONENT PARTS OF THE SUPPLY SIDE BASE

- Replacement of the S Sub Base, TG-4, TG-5, and IR-2 (impedance roller guide) on the S Base differs from replacement of the other components.
- Refer to Section 4-22-1 for TG-4, Section 4-22-2 for TG-5, Section 4-22-3 for IR-2, Section 4-22-4 for S Sub Base, and Section 4-22-5 for replacing the other components.

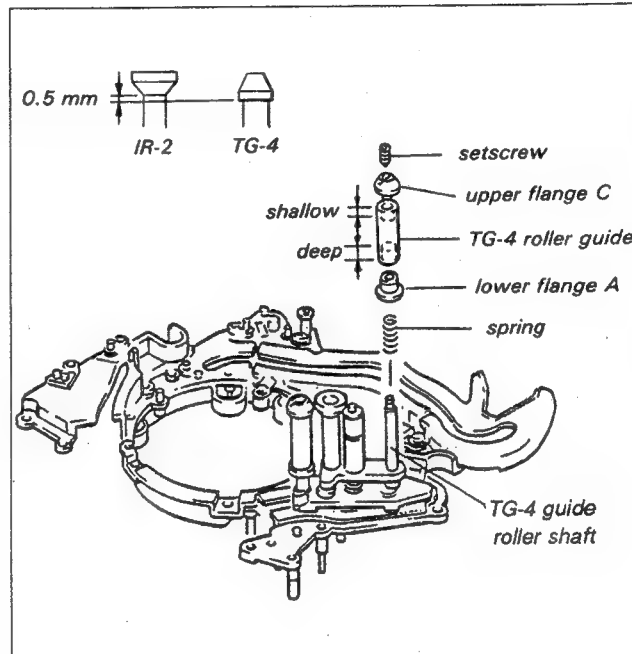
4-22-1. Replacement of the TG-4

Tool: Tape guide adjustment screwdriver

Mode: EJECT

Replacement procedure:

- (1) Loosen the setscrew at the top of the TG-4 with the tape guide adjustment screwdriver.
- (2) Remove the Upper Flange C.
- (3) Remove the TG-4 Roller Guide, Lower Flange A, and the compression spring.
- (4) Clean the TG-4 Guide Roller Shaft with the cleaning piece moistened with cleaning fluid.
- (5) Insert the compression spring removed in Step (3) onto the TG-4 Guide Roller Shaft.
- (6) Carefully insert the Lower Flange A and TG-4 Roller Guide onto the TG-4 Guide Roller Shaft in the direction as shown in the figure.
- (7) Install the Upper Flange C, and adjust the position of the TG-4 Roller Guide so that the lower end of the Upper Flange of the TG-4 Guide Roller is about 0.5mm lower than the lower end of the IR-2 Guide Upper Flange.
- (8) Tighten the setscrew at the top of the guide using a tape guide adjustment screwdriver.
- (9) After replacement, perform the adjustments in Section 4-42.



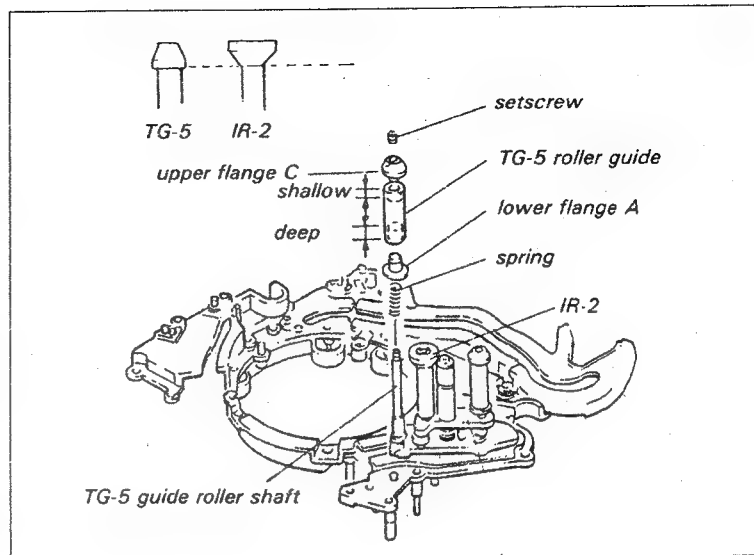
4-22-2. Replacement of the TG-5

Tool: Tape guide adjustment screwdriver

Mode: EJECT

Replacement procedure:

- (1) Loosen the setscrew at the top of TG-5 with the tape guide adjustment screwdriver.
- (2) Remove the Upper Flange C.
- (3) Remove the TG-5 Roller Guide, Lower Flange A, and the compression spring.
- (4) Clean the TG-5 Guide Roller Shaft with a cleaning piece moistened with cleaning fluid.
- (5) Insert the compression spring removed in Step (3) onto the TG-5 Guide Roller Shaft.
- (6) Carefully insert Lower Flange A and the TG-5 Roller Guide onto the TG-5 Guide Roller Shaft in the direction as shown in the figure.
- (7) Install the Upper Flange C, and adjust the position of the TG-5 Guide Roller so that the lower end of the Upper Flange is the same in height as the lower end of the IR-2 Guide Upper Flange as viewed.
- (8) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
- (9) After replacement, perform the adjustments in Section 4-42.



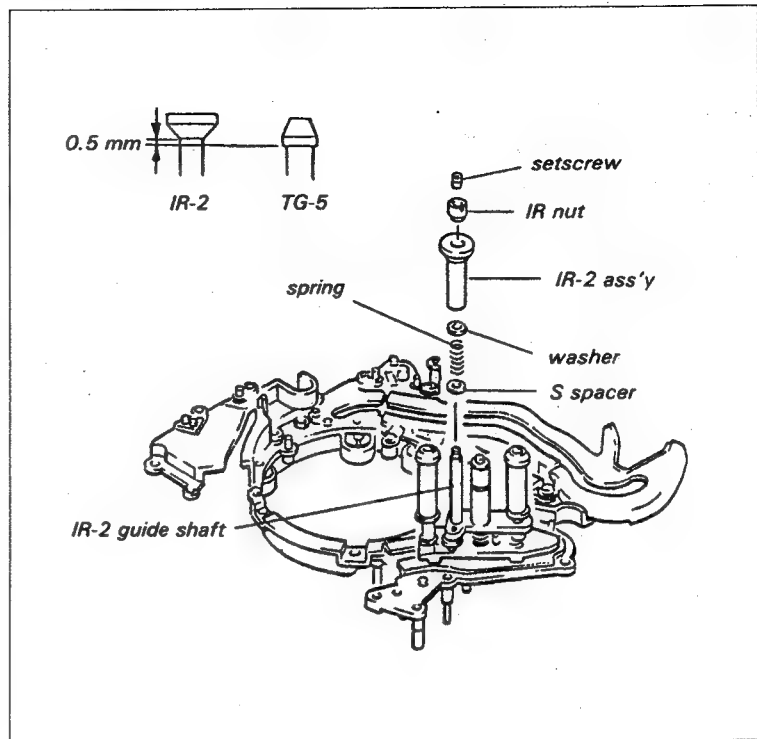
4-22-3. Replacement of the IR-2 Guide (Impedance Roller Guide)

Tool: Tape guide adjustment screwdriver

Mode: EJECT

Replacement procedure:

- (1) Loosen the setscrew at the top of the IR-2 Guide with the tape guide adjustment screwdriver.
- (2) Remove the IR Nut.
- (3) Remove the IR-2 Assembly, washer (1.4mm dia.), compression spring, and S Spacer from the IR-2 Guide Shaft.
- (4) Clean the IR-2 Guide Shaft with a cleaning piece moistened with cleaning fluid.
- (5) Install the S Spacer, compression spring, and washer (1.4mm dia.) removed in Step (3) onto the IR-2 Guide Shaft.
- (6) Carefully insert the new IR-2 Assembly onto the IR-2 Guide Shaft.
- (7) Install the IR Nut, and adjust the position of the IR-2 Guide so that the lower end of the IR-2 Guide Upper Flange is about 0.5mm higher than the lower end of the TG-5 Guide Upper Flange.
- (8) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
- (9) After replacement, perform the adjustments in Section 4-42.



4-22-4. Replacement of the Supply Side Sub Base

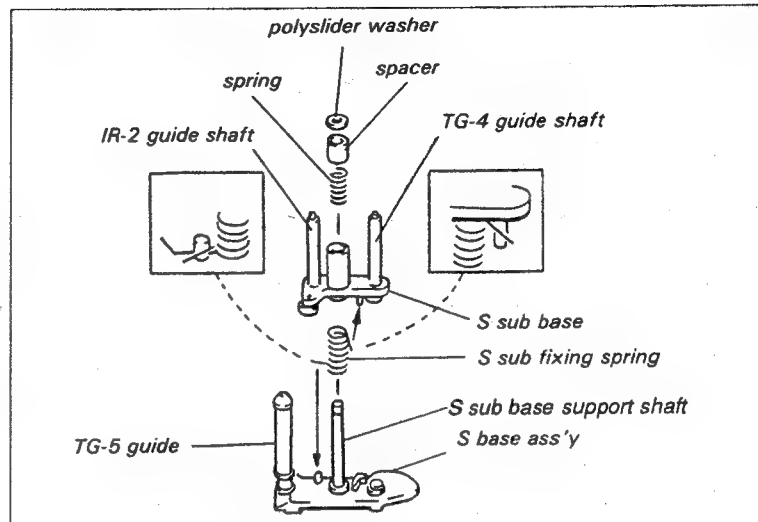
•The TG-4 and IR-2 Guides are provided on the S Sub Base. When replacing the S Sub Base, replace the TG-4 and IR-2 Guides referring to Sections 4-22-1 and 4-22-3. Then, adjust the height with the TG-5 Guide as reference.

Tool: Tape guide adjustment screwdriver

Mode: EJECT

Replacement procedure:

- (1) Remove the polyslider washer at the top of the S Sub Base.
- (2) Remove the spacer, compression spring, S Sub Base on which TG-4 and IR-2 Guide are installed, and S Sub Fixing Spring.
- (3) Clean the new S Sub Base TG-4 Guide Shaft and IR-2 Guide Shaft with a cleaning piece moistened with cleaning fluid.
- (4) Remove the TG-4 Guide Roller and IR-2 Impedance Roller from the S Sub Base removed in Step (2) and install them on the new S Sub Base.
- (5) Clean the S Sub Base Support Shaft with a cleaning piece moistened with cleaning fluid.
- (6) Insert the S Sub Fixing Spring, S Sub Base (assembled in Step (4)), compression spring, and spacer onto the S Sub Base Support Shaft.
- (7) Hook the S Sub Fixing Spring as shown in the figure.
- (8) Insert the polyslider washer (1.5mm dia.) onto the top of the S Sub Base Shaft and fasten the S Sub Base.
- (9) Adjust the height of the TG-4 and IR-2 Guides with the TG-5 Guide as reference. (Refer to Sections 4-22-1 and 4-22-3).
- (10) After replacement, perform the adjustments in Section 4-42.



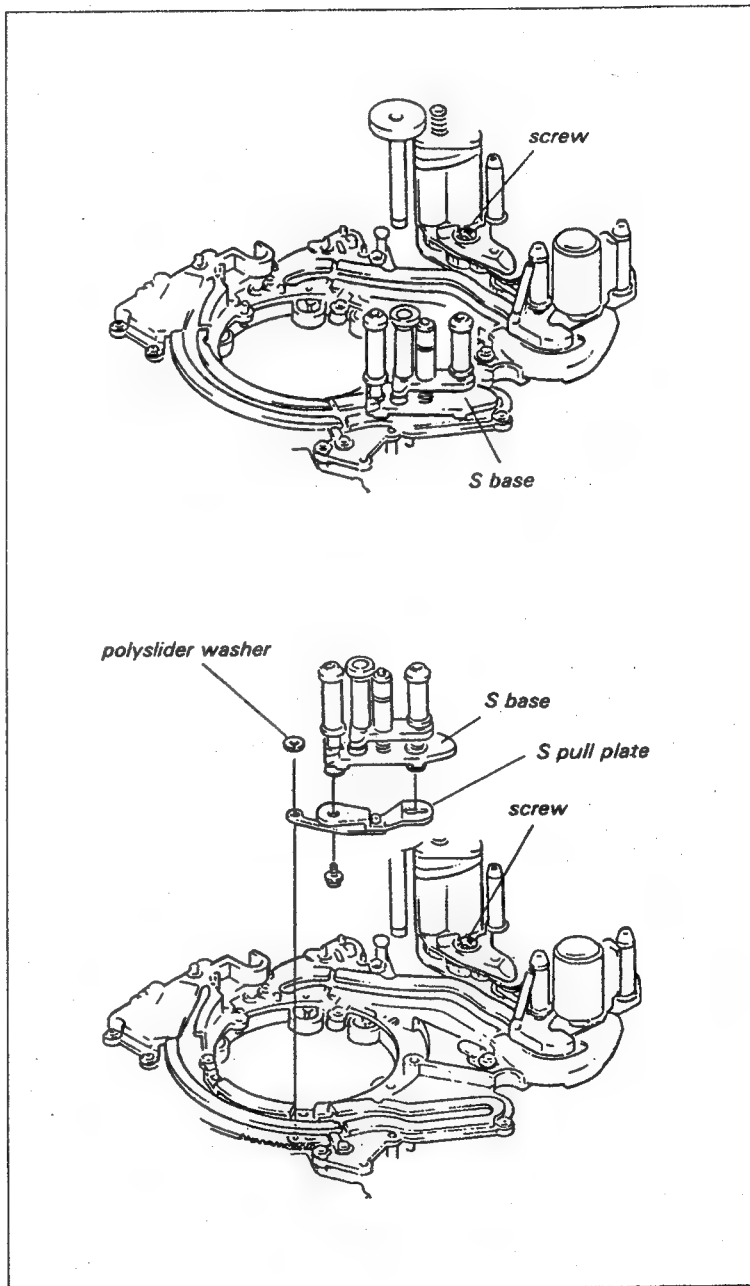
4-22-5. Replacement of the Component Parts of the Supply Side Base

- Refer to the appropriate section for replacing the TG-4, TG-5, and IR-2 Guides on the S Base.
- When replacing the components other than the above components on the S Base, remove the Drum Assembly from the unit so as not to damage it.

Mode: Turn the screw shown in the figure so that the S Side base reaches the end of the S Side rail.

Replacement procedure:

- (1) Remove the Drum Assembly from the unit. (Refer to Section 4-6).
- (2) Turn the screw and set the S Side Base in the position described above.
- (3) Remove the S Side Rail (I). (Refer to Section 4-32).
- (4) Remove the polyslider washer fixing the Supply Side Pull Plate and remove the S Side Base from the unit.
- (5) Replace the faulty component which constitutes the S Side base.
- (6) Assemble the S Side Base by reversing the Steps (1) through (4).
- (7) After replacement, perform the adjustments in Section 4-42.



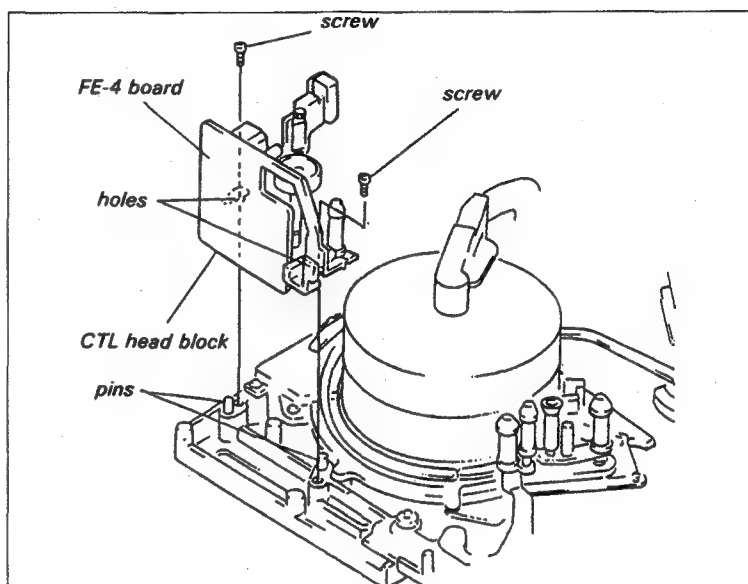
4-23. REPLACEMENT OF THE CTL HEAD BLOCK

- The CTL Head Block consists of the CTL Head, Erase Head, FE-4 Board, IR-1 Guide (impedance roller guide), and tape guide. Replacement of the above components is described below.
- When replacing the CTL Head, Erase Head, and FE-4 Board, remove the CTL Head Block from the unit. The removal and installation are described below.

Mode: EJECT

Removal and installation:

- Remove the two fixing screws of the CTL Head Block and remove the CTL Head Block from the unit. When removing, raise the CTL Head Block connector CN43 at the lower portion of the FE-4 Board which is connected into the mother board (MB-317AP Board).
- Install the CTL Head Block on the chassis with the two screws so that the two pins of the chassis are inserted into the CTL Head Block holes.

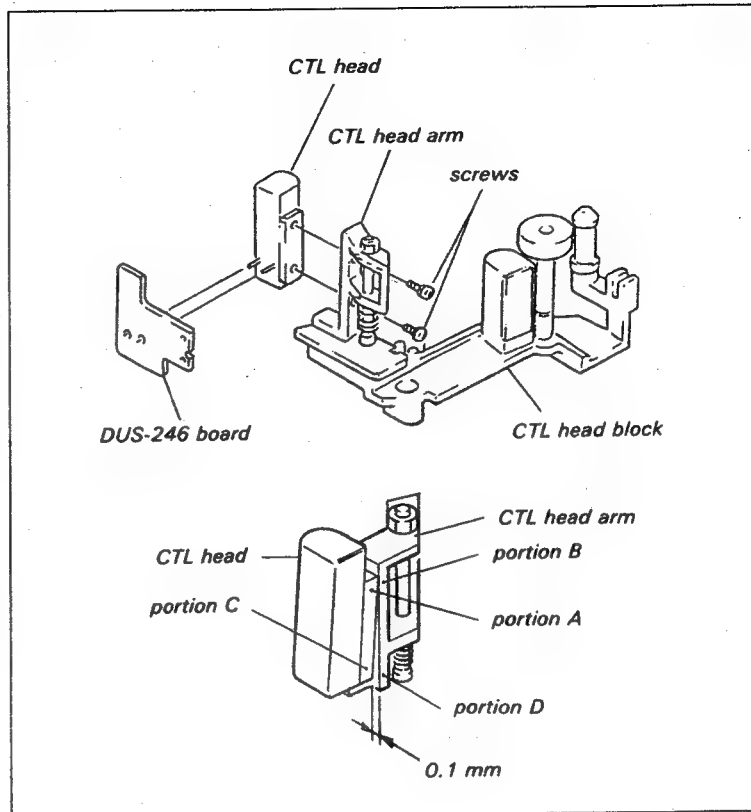


4-23-1. Replacement of the CTL Head

Mode: EJECT

Replacement procedure:

- (1) Remove the CTL Head Block from the unit.
- (2) Unsolder the DUS-246 Board which is mounted onto the CTL Head.
- (3) Remove the two screws of the CTL Head Arm and remove the CTL Head.
- (4) Install the new CTL Head to the CTL Head Arm with two screws snugly but do not tighten.
- (5) Adjust the CTL Head position so that the surface of the CTL Head Bracket's upper end (portion A in the figure) is the same plane as that of the CTL Head Arm's upper end (portion B), and the CTL Head Bracket's lower end (portion C) is shifted by 0.1 mm with respect to CTL Head Arm's lower end (portion D) as shown in the figure. Then, tighten the two fixing screws.
(Tightening torque: $3 \pm 0.5 \text{ kg.cm}$)
- (6) Solder the DUS-246 Board removed in Step (2).
- (7) Install the CTL Head Block on the unit.
- (8) After replacement, perform the adjustments in Section 4-42.

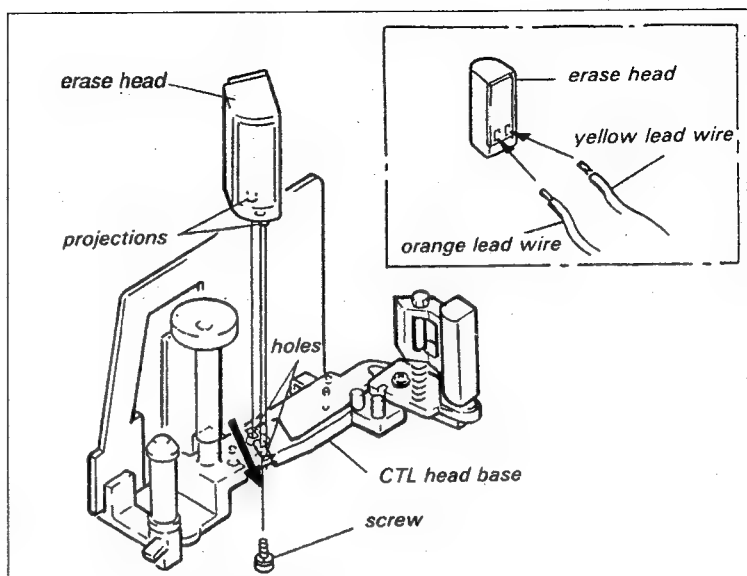


4-23-2. Replacement of the Erase Head

Mode: EJECT

Replacement procedure:

- (1) Remove the CTL Head Block from the unit.
- (2) Remove a screw from the lower side of the CTL Head Block and remove the Erase Head.
- (3) Unsolder the two lead wires of the Erase Head.
- (4) Solder two lead wires onto the new Erase Head.
(When viewed from the back of the head, the yellow lead wire is located on the right, and the orange on the left.)
- (5) Insert the two projections at the lower portion of the head into the holes of the CTL Head Base, and tighten the fixing screw while pushing it in the direction of the arrow.
- (6) Install the CTL Head Block on the unit.
- (7) After replacement, perform the adjustment in Section 4-42.

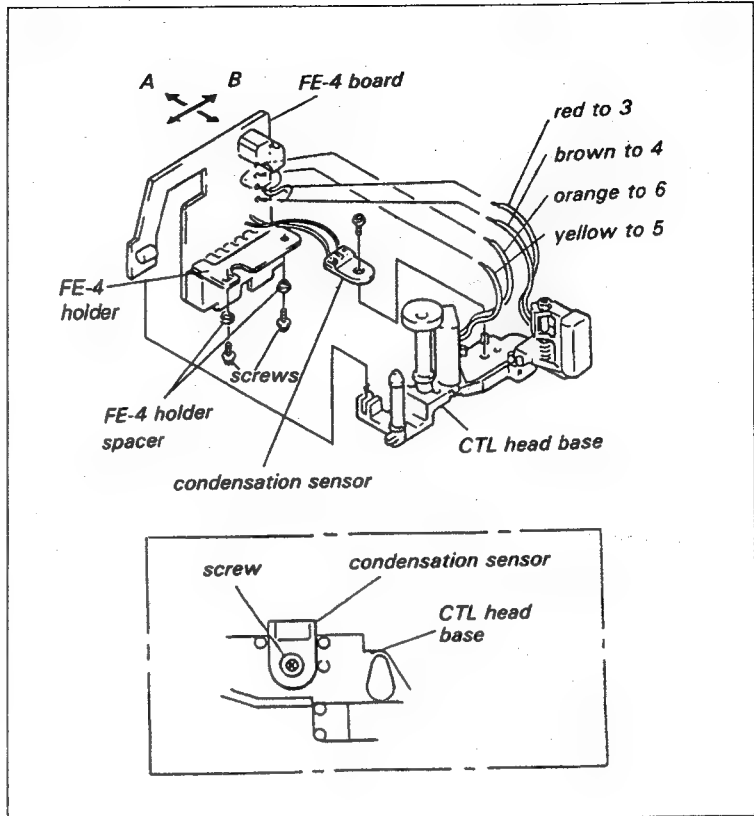


4-23-3. Replacement of the FE-4 Board

Mode: EJECT

Replacement procedure:

- (1) Remove the CTL Head Block from the unit.
- (2) Remove the condensation sensor which is attached to the CTL Head Base.
- (3) Remove the two screws from the lower side of the CTL Head Block and remove the FE-4 Board. The FE-4 Holder Spacers are inserted between the FE-4 Holder and screw. Be sure not to lose them.
- (4) Unsolder the four lead wires on the FE-4 Board.
- (5) Solder the lead wire removed in Step (4) onto the new FE-4 Board. (The brown lead wire is to 4, the red to 3, the orange to 6, and the yellow to 5.)
- (6) Install the Condensation sensor removed in Step (2) in the position shown in the figure.
- (7) Pass the FE-4 Holder Spacer through the screw in the direction as shown in the figure and install the FE-4 Board on the CTL Head Base.
- (8) Check that the FE-4 Board is slightly shifted in the direction of the arrows A and B.
- (9) Install the CTL Head Block on the unit.
- (10) After replacement, perform the adjustment in Section 4-42.



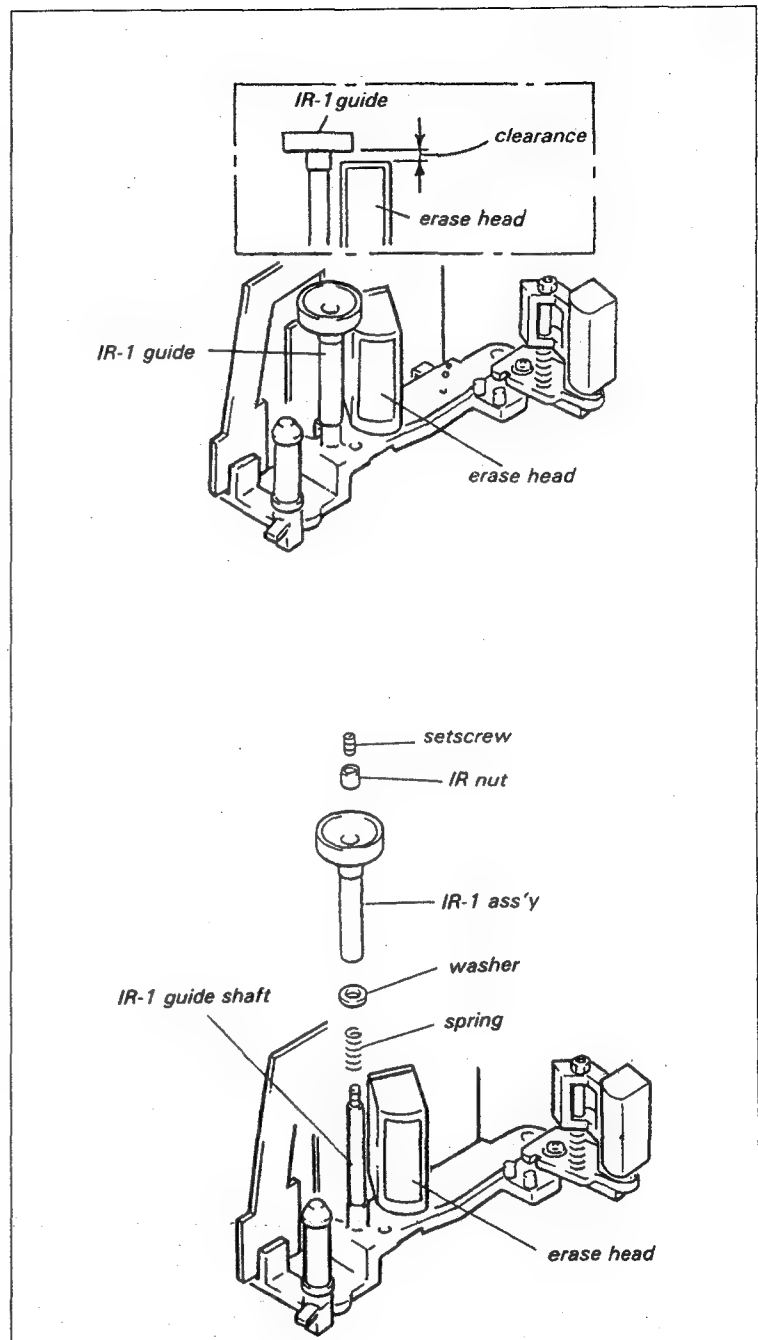
4-23-4. Replacement of the IR-1 Guide (Impedance Roller Guide)

Tool: Thickness gauge
Tape guide adjustment screwdriver

Mode: EJECT

Replacement procedure:

- (1) Measure the clearance between the lower surface of the IR-1 Guide's Upper Flange and Erase Head with the thickness gauge. (The clearance should be memorized.)
- (2) Loosen the setscrew at the top of the IR-1 Guide with the tape guide adjustment screwdriver.
- (3) Remove the IR Nut,
- (4) Remove the IR-1 Assembly, washer(1.4mm dia.), and compression spring from the IR-1 Guide Shaft.
- (5) Clean the IR-1 Guide Shaft with a cleaning piece moistened with cleaning fluid.
- (6) Install the compression spring and washer(1.4mm dia.) remove in Step (4) onto the IR-1 Guide Shaft.
- (7) Carefully insert the new IR-1 Assembly onto the IR-1 Guide Shaft.
- (8) Install the IR Nut.
- (9) Adjust the height of the IR-1 Guide using the IR Nut so that the clearance between the lower surface of the IR-1 Guide's Upper Flange and the Erase Head is the same as the clearance measured in Step (1).
- (10) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
- (11) Recheck the clearance between the lower surface of the IR-1 Guide's Upper Flange and the Erase Head. When the clearance does not meet the required specification, repeat Steps (9) and (10).
- (12) After replacement, perform the adjustment in Section 4-42.



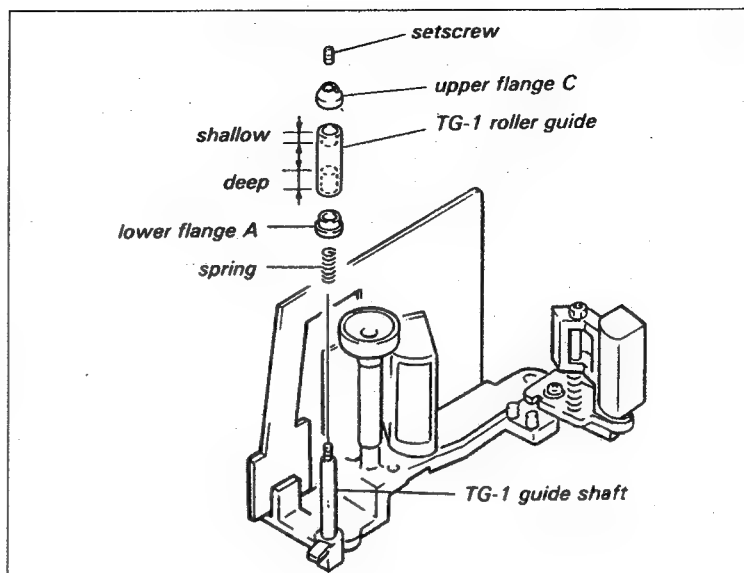
4-24. REPLACEMENT OF THE TG-1

Tool: Tape guide adjustment screwdriver

Mode: EJECT

Replacement procedure:

- (1) Loosen the setscrew at the top of the TG-1 with the tape guide adjustment screwdriver.
- (2) Remove the Upper Flange C.
- (3) Remove the TG-1 Roller Guide, Lower Flange A, and the compression spring.
- (4) Clean the TG-1 Guide Shaft with a cleaning piece moistened with cleaning fluid.
- (5) Insert the compression spring removed in Step (3) onto the TG-1 Guide Shaft.
- (6) Carefully insert the Lower Flange A and the TG-1 Roller Guide onto the TG-1 Guide Shaft in the direction as shown in the figure.
- (7) Install the Upper Flange C.
- (8) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
- (9) After replacement, perform the adjustment in Section 4-42.



4-25. REPLACEMENT OF THE A/T HEAD

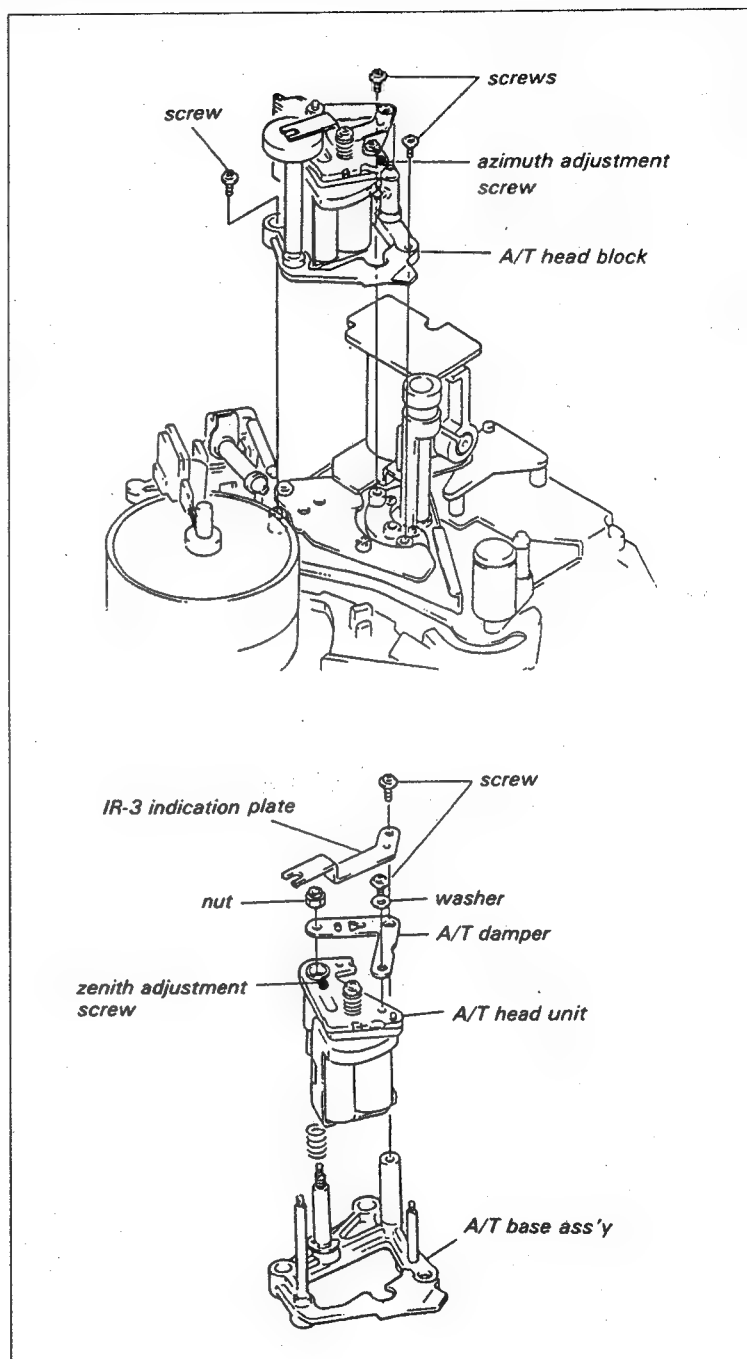
- When replacing the A/T Head, be careful not to loosen or tighten the azimuth adjustment screw and zenith adjustment screw shown in the figure.

Tool: Plate parallel
Thickness gauge
Tweezers
Flatness check tool

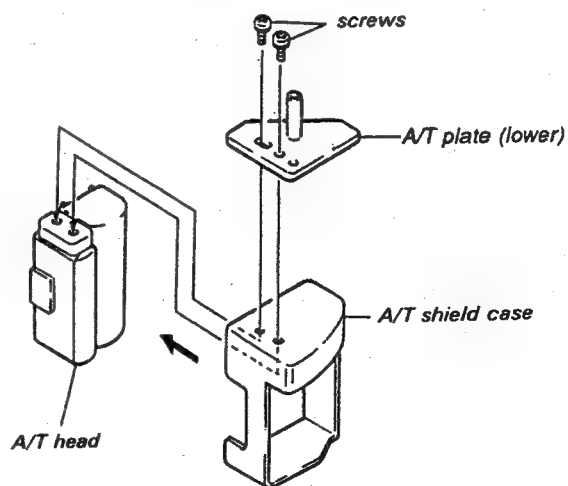
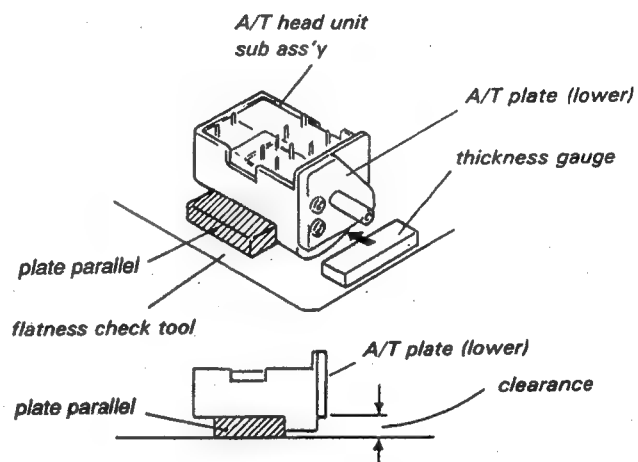
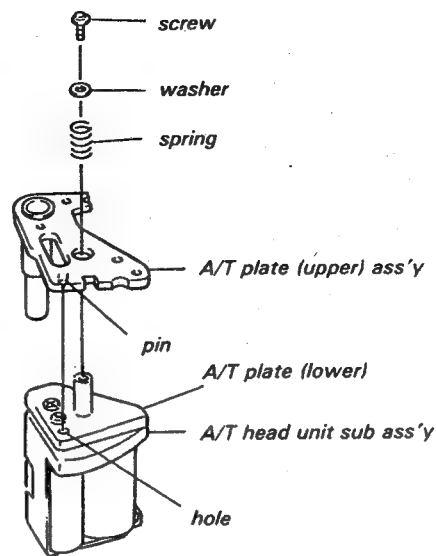
Mode: EJECT

Replacement procedure:

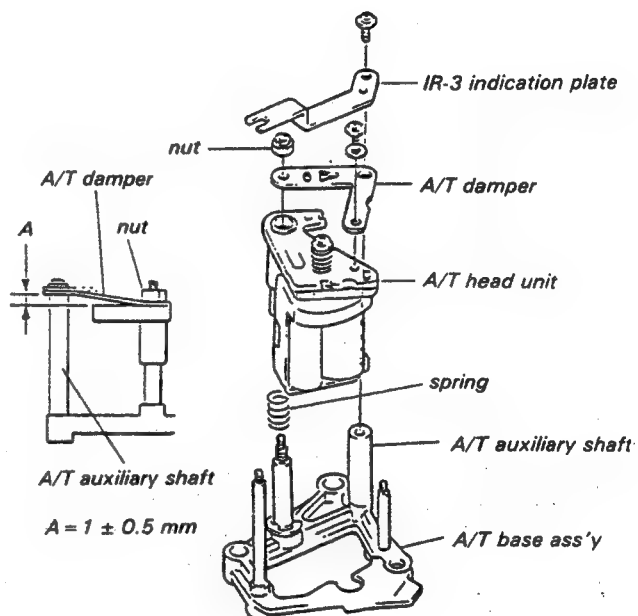
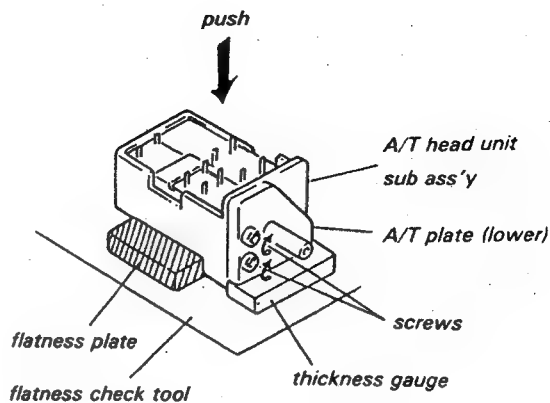
- (1) Remove the flexible board (FL-55P Board) of the A/T Head Block which is connected to connectors CN3 and CN7 on the TB-5 Board with the tweezers. (Refer to Section 3-9).
- (2) Remove the three fixing screws of the A/T Head Block and remove the A/T Head Block from the unit. Be careful not to damage the flexible board (FL-55P Board).
- (3) Unsolder the ten terminals the FL-55P Board which is soldered to the A/T Head and remove the FL-55P Board from the A/T Head Block.
- (4) Remove the two screws and one nut shown in the figure, then remove the A/T Head Unit from the A/T Head Block.



- (5) Remove the screw located in the center of the A/T Head Unit and remove the A/T Head Unit Sub Assembly from the A/T Plate (Upper) Assembly.
 - (6) As shown in the figure, put the flatness plate on the flatness check tool and place the A/T Head Unit Sub Assembly (removed in Step (5)) on it.
 - (7) Check the clearance between the flatness check tool and the edge of the A/T Plate (Lower) with the thickness gauge.
 - (8) Remove the two screws shown in the figure, remove the A/T Head and A/T Shield Case from the A/T Plate (Lower), and replace the new A/T Head. Thread the two screws on the head snugly but do not tighten.
 - (9) Put the A/T Head Unit Sub Assembly on the flatness check tool as in Step (6) and insert the thickness gauge checked in Step (7) between the A/T Plate (Lower) and flatness check tool.
 - (10) Tighten the two A/T Head fixing screws while pushing the A/T Head and A/T Plate (Lower) toward the flatness check tool.
- (NOTE) Be careful not to damage the head.



- (11) Install the A/T Head Unit Sub Assembly on the A/T Plate (Upper) Assembly by reversing the Step (5). Check that the pin of the A/T Plate (Upper) Assembly is inserted into the hole of the A/T Plate (Lower).
- (12) Install the A/T Head Unit on the A/T Base Assembly. As shown in the figure, adjust the nut so that clearance A (See next page) between the tip of the A/T Auxiliary Shaft and A/T Plate (Upper) Assembly meets the required specification as viewed.
- (13) Assemble the A/T Head Block in the unit by reversing the Steps (1) through (3).
- (14) After replacement, perform the adjustment in Section 4-42.



4-26. REPLACEMENT OF THE IR-3 GUIDE (IMPEDANCE ROLLER GUIDE)

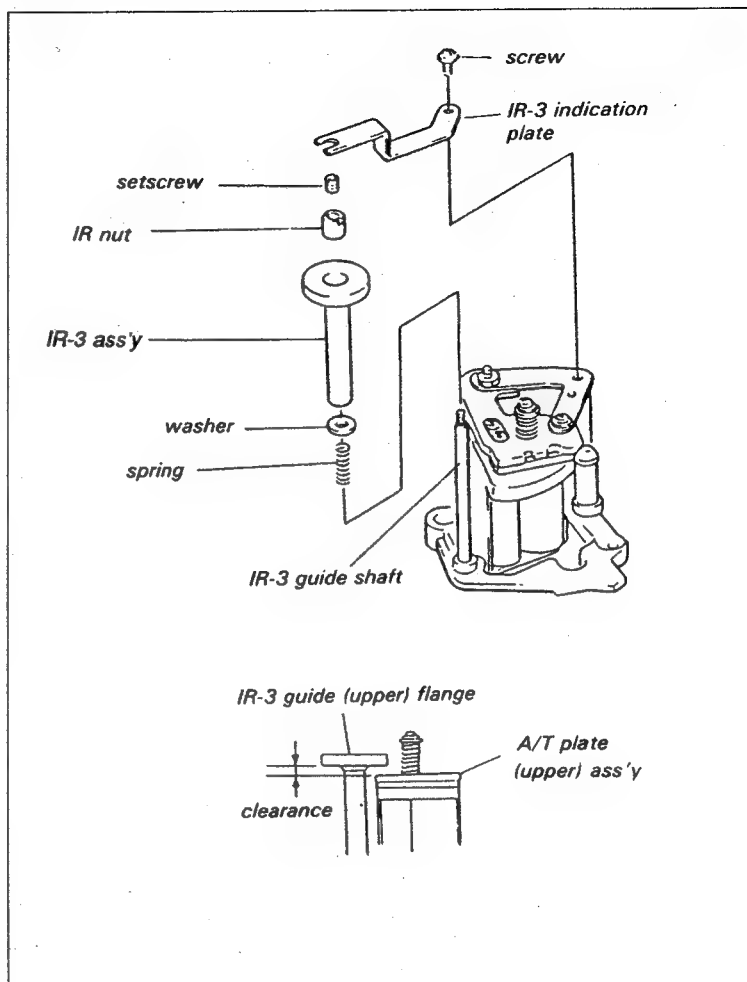
Tool: Thickness gauge

Tape guide adjustment screwdriver

Mode: EJECT

Replacement procedure:

- (1) Measure the clearance between the lower surface of an IR-3 Guide's Upper Flange and the A/T Plate (Upper) Assembly with the thickness gauge.
(The clearance should be memorized.)
- (2) Remove the screw and remove the IR-3 Supporting Plate.
- (3) Loosen the setscrew at the top of the IR-3 Guide with the tape guide adjustment screwdriver.
- (4) Remove the IR nut.
- (5) Remove an IR-3 Assembly, washer (1.4mm dia.), and compression spring from the IR-3 Guide Shaft.
- (6) Clean the IR-3 Guide Shaft with a cleaning piece moistened with cleaning fluid.
- (7) Install the compression spring and washer (1.4mm dia.) removed in Step (5) onto the IR-3 Guide Shaft.
- (8) Carefully insert the new IR-3 Assembly onto the IR-3 Guide Shaft.
- (9) Install the IR Nut.
- (10) Adjust the height of the IR-3 Guide using the IR Nut so that the clearance between the lower surface of the IR-3 Guide's Upper Flange and the A/T Plate (Upper) Assembly is the same as the clearance measured in Step (1).
- (11) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
- (12) Recheck the clearance between the lower surface of the IR-3 Guide's Upper Flange and the A/T Plate (Upper) Assembly. When the clearance dose not meet the required specification, repeat Steps (10) and (11).
- (13) After replacement, perform the adjustments in Section 4-42.



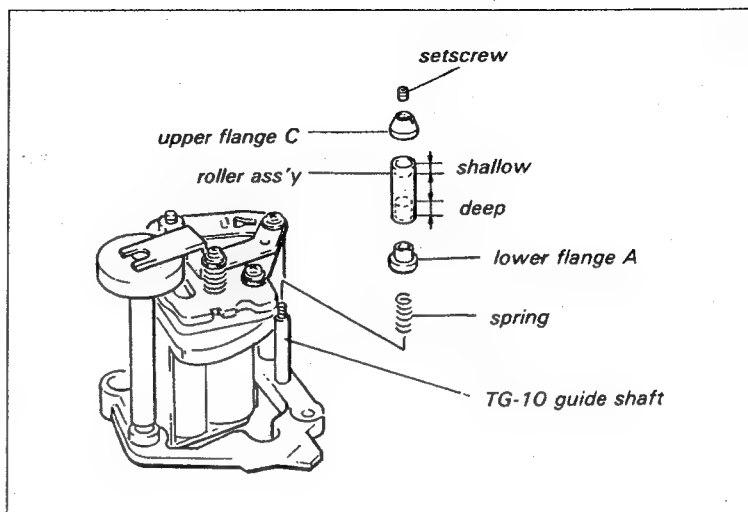
4-27. REPLACEMENT OF THE TG-10

Tool: Tape guide adjustment screwdriver

Mode: EJECT

Replacement procedure:

- (1) Loosen the setscrew at the top of the TG-10 with the tape guide adjustment screwdriver.
- (2) Remove the Upper Flange C.
- (3) Remove the Roller Assembly, Lower Flange A, and the compression spring.
- (4) Clean the TG-10 Guide Shaft with a cleaning piece moistened with cleaning fluid.
- (5) Insert the compression spring removed in Step (3) onto the TG-5 Guide Shaft.
- (6) Carefully insert the Lower Flange A and the Roller Assembly onto TG-10 Guide Shaft in the direction shown in the figure.
- (7) Install the Upper Flange C.
- (8) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
- (9) After replacement, perform the adjustments in Section 4-42.



4-28. REPLACEMENT OF THE COMPONENT PARTS OF THE TAKE-UP SIDE SUB BASE

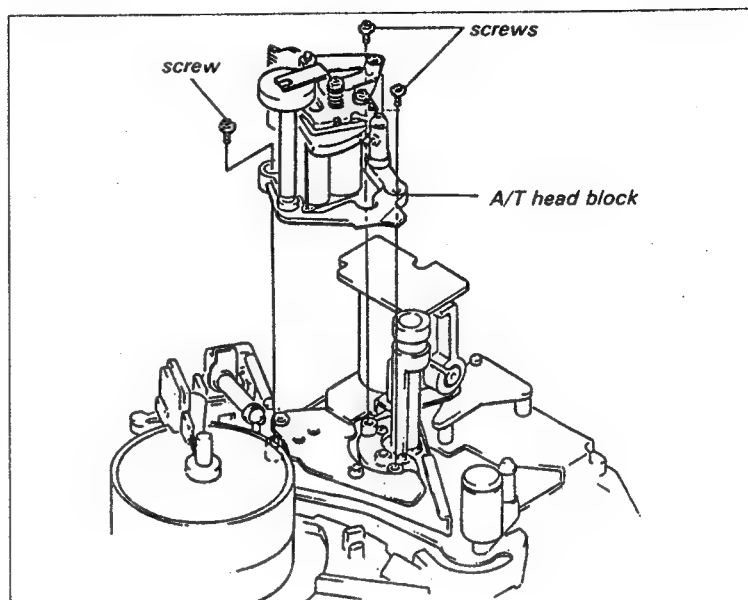
- The T Sub Base Block consists of the TG-8 and the Slant Guide. Replacement of the above components is described below.
- When replacing the above components, remove the A/T Head Block from the unit. The removal and installation procedures are described below.

Tool: Tweezers

Mode: EJECT

Removal and installation Procedures:

- Remove the flexible board (FL-55P Board) of the A/T Head Block which is connected to connectors CN3 and CN7 on the TB-5 Board with the tweezers. (Refer to Section 3-9.)
- Remove the three fixing screws of the A/T Head Block and remove the A/T Head Block from the unit. Be careful not to damage the flexible board (FL-55P Board) and A/T Head.
- Install by reversing the above.
- When replacing the component of the T Sub Base, not to remove the frame of the T Sub Base (T Sub Rotation Table) and T Sub Adjustment Plate from the unit.



4-28-1. Replacement of the TG-8

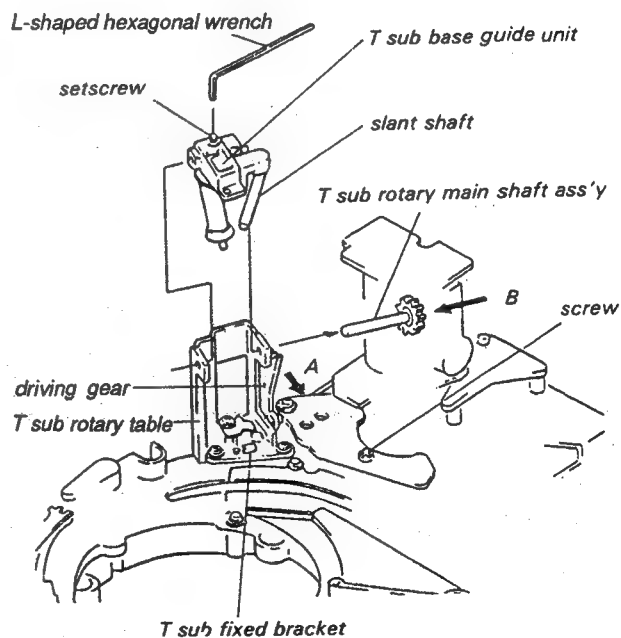
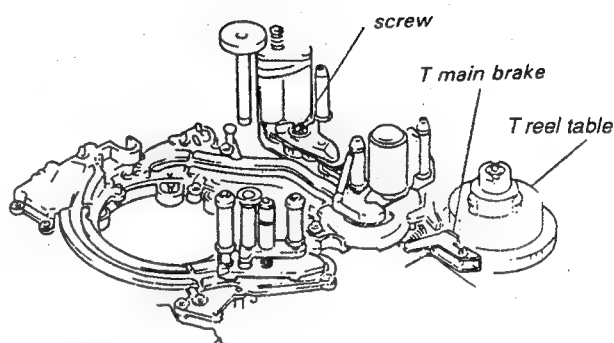
- TG-8 is the component part of the T Sub Base Block.

Tool: L-shaped hexagonal wrench (across flat has 0.89mm.)
Tension gauge (50g full scale)

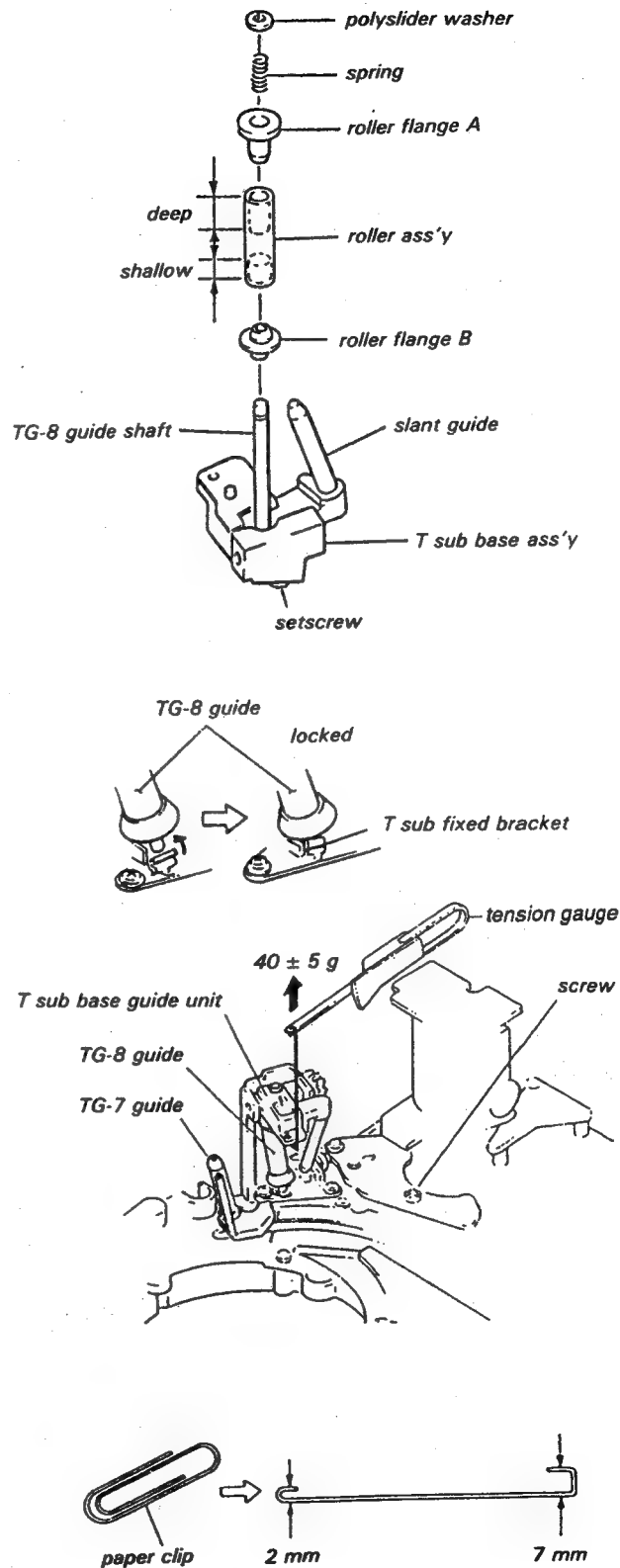
Mode: EJECT → Threading end → EJECT

Replacement procedure:

- (1) Turn the screw clockwise until each of the tape guides are at position of the threading end as shown in the figure. Keep turning clockwise until the T Main Brake is pressed against the T Reel.
- (2) Remove the A/T Head Block from the unit.
- (3) Loosen the setscrew at the top of the T Sub Base by turning two or three times with the L-shaped hexagonal wrench.
- (4) Pull the T Sub Rotary Main Shaft Assembly to the A/T head side. Then the T Sub Base Guide Unit can be removed.
- (5) Remove the polyslider washer from the top of the TG-8 Guide.
- (6) Remove the compression spring, Roller Flange A, Roller Assembly (TG-8), and Roller Flange B from the TG-8 Guide Shaft.
- (7) Clean the TG-8 Guide Shaft with a cleaning piece moistened with cleaning fluid.
- (8) Carefully insert the Roller Flange B, Roller Assembly (TG-8), and Roller Flange A onto the TG-8 Guide Shaft in the direction as shown in the figure.
- (9) Insert the compression spring onto the TG-8 Guide Shaft, then push the 1.2mm diameter polyslider washer on the shaft.
- (10) Install the assembled T Sub Base Guide Unit onto the T Sub Rotary Table with the T Sub Rotary Main Shaft assembly. (Do not tighten the setscrew too much.)



- (11) Slowly turn the screws mentioned in Steps (1) counterclockwise until the T Sub Fixed Bracket touches the T Sub Rotary Table. (At that time, do not move the Driving Gear of the T Sub Rotary Table.)
- (12) Push the top edge of the TG-8 Guide Shaft onto the T Sub Rotary Table side (the opposite side to the drum).
- (13) Turn the screws clockwise until the T Main Brake is pressed against the T Reel Table as described in Step (1).
- (14) While pushing the Driving Gear in the direction of the arrow A and T Sub Rotary Main Shaft Assembly in the direction of the arrow B, tighten the setscrew.
- (15) Turn the screw described in Step (1) so that the top edge of the TG-8 is locked by the T Sub Fixed Bracket.
- (16) Reform the small paper clip as shown in the figure.
- (17) Insert the reformed paper clip into the hole of the T Sub Base Guide Unit and hang the tension gauge on the other end.
- (18) Move the tension gauge in the upward direction to the unit until it shows 40 ± 5 g. (Never applied 50g or more.)
- (19) Turn the screw described in Step (1) clockwise, and check that the top edge of the TG-8 Guide is firmly locked by the T Sub Fixed Bracket. When threading or unthreading check that the TG-8 Guide Roller and the TG-7 Guide are not touching. If the specification is not satisfied, perform the Step (14) again. At that time, change the degree of pressure a little when pushing in the direction of arrow A.



4-28-2. Replacement of the Slant Guide

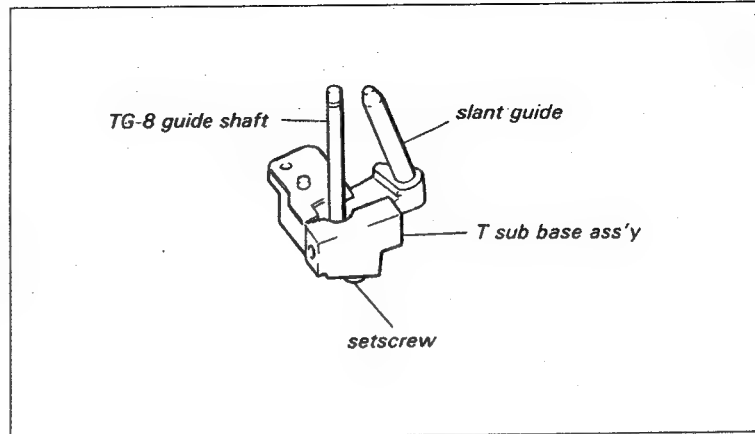
- The Slant Guide is the component part of the T Sub Base Block.

Tool: L-shaped hexagonal wrench (across flat has 0.89mm dia.)

Mode: EJECT → Threading end →EJECT

Replacement procedure:

- (1) The same as in Steps (1) through (6) of Section 4-28-1.
- (2) Remove the setscrew from the removed T Sub Base Assembly and install it on the new T Sub Base Assembly.
- (3) Clean the TG-8 Guide Shaft of the T Sub Base Assembly and Slant Guide with a cleaning piece moistened with cleaning fluid.
- (4) Assemble as described in Steps (8) through (19) of Section 4-28-1.
- (5) After replacement, perform the adjustments in Section 4-42.



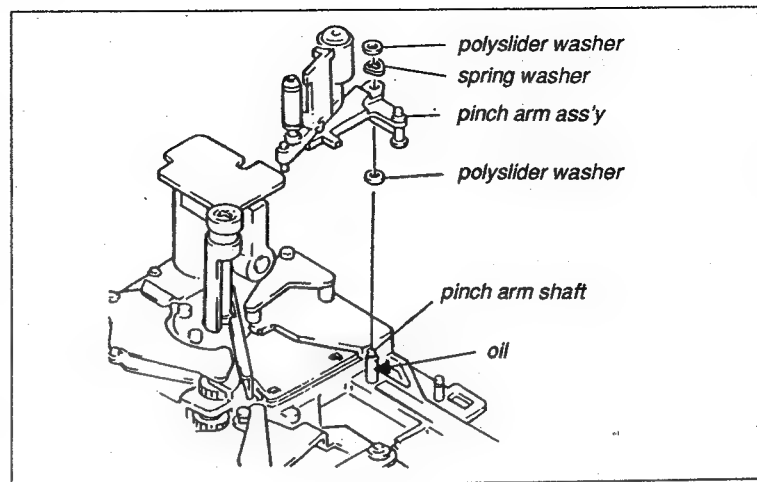
4-29. REPLACEMENT OF THE PINCH ARM ASSEMBLY

Tool: Tweezers

Mode: EJECT

Replacement procedure:

- (1) Remove the Pinch Arm Lock Lever from the unit.
(Refer to Section 4-19.)
- (2) Remove the polyslider washer fixing the Pinch Arm Assembly and remove the assembly from the unit.
- (3) Clean the Pinch Arm Shaft with a cleaning piece moistened with cleaning fluid.
- (4) Apply a 1/4 drop of Sony oil on the Pinch Arm Shaft.
- (5) Install the new Pinch Arm Assembly.
- (6) Insert the polyslider washer (1.2mm dia.) onto the shaft and fasten the Pinch Arm Assembly.
- (7) Install the Pinch Arm Lock Lever.
(Refer to Section 4-19.)
- (8) After replacement, perform the adjustment in Section 4-42.



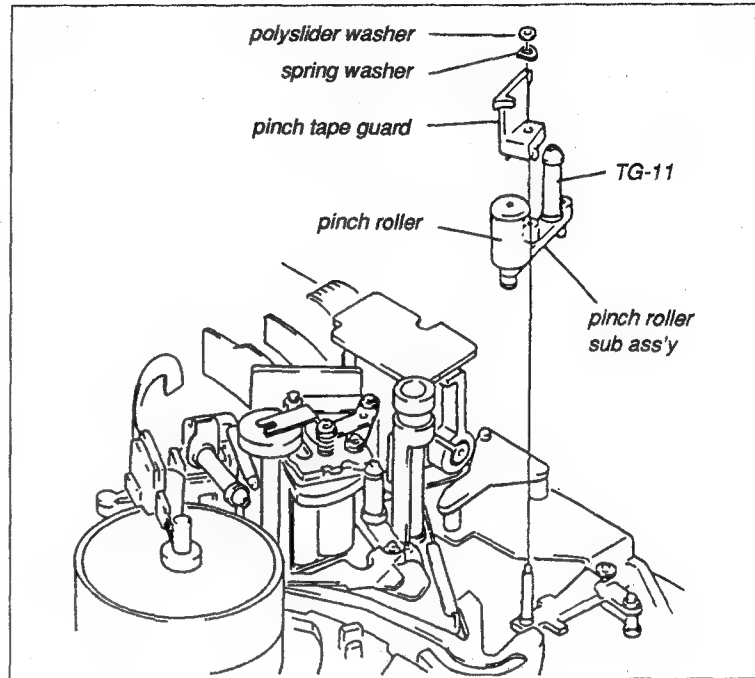
4-30. REPLACEMENT OF THE PINCH ROLLER SUB ASSEMBLY

- The TG-11 Guide is installed on the shaft of the Pinch Roller sub Assembly.
- When replacing the Pinch Roller Sub Assembly, the TG-11 Guide must be replaced at the same time.
(Refer to Section 4-31.)

Mode: EJECT

Replacement procedure:

- (1) Remove the polyslider washer fixing the Pinch Roller Sub Assembly onto the Pinch Arm Assembly.
- (2) Remove the Pinch Tape Guard and the Pinch Roller Sub Assembly from the unit.
- (3) Install the TG-11 Guide of the old Pinch Roller Sub Assembly onto the new Pinch Roller Sub Assembly as described in Section 4-31.
- (4) After installing the Pinch Roller Sub Assembly and the Pinch Tape Guard on the Pinch Arm Assembly, push a polyslider washer onto the shaft.
- (5) Clean the pinch roller with a cleaning piece moistened with cleaning fluid.



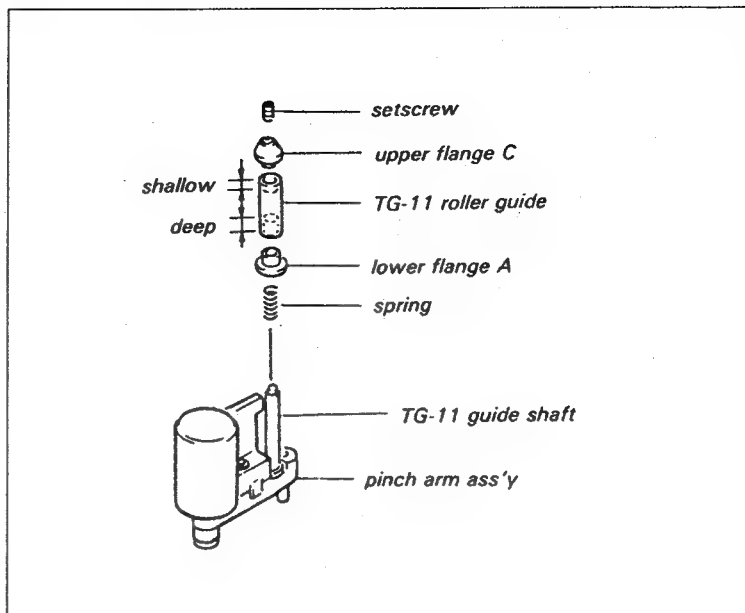
4-31. REPLACEMENT OF THE TG-11

Tool: Tape guide adjustment screwdriver

Mode: EJECT

Replacement procedure:

- (1) Loosen the setscrew at the top of the TG-11 with the tape guide adjustment screwdriver.
- (2) Remove the Upper Flange C.
- (3) Remove the TG-11 Roller Guide, Lower Flange A, and the compression spring.
- (4) Clean the TG-11 Guide Shaft with a cleaning piece moistened with cleaning fluid.
- (5) Insert the compression spring removed in Step (3) onto the TG-11 Shaft.
- (6) Carefully insert the Lower Flange A and the TG-11 Roller Guide onto the TG-11 Guide Shaft in the direction as shown in the figure.
- (7) Install the Lower Flange C.
- (8) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
- (9) After replacement, perform the adjustment in Section 4-42.

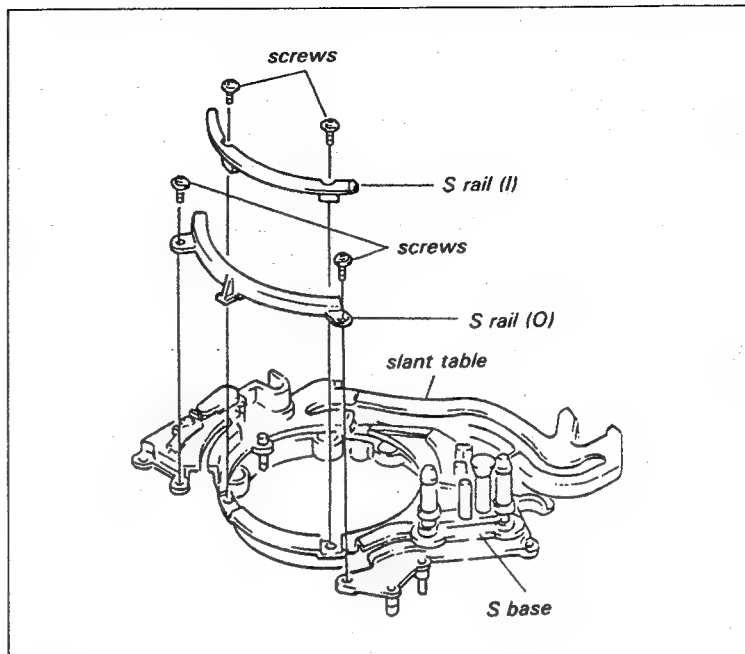


4-32. REPLACEMENT OF THE SUPPLY SIDE RAIL (I)

Mode: EJECT

Replacement procedure:

- (1) Remove the Drum Assembly from the unit.
(Refer to Section 4-6.)
- (2) Remove the two screws on the S Rail (I) and remove it from the unit.
- (3) Install the new S Rail (I) on the unit so that the clearance between the new S Rail (I) and S Rail (O) is 3.1 to 3.4mm.
- (4) Repeat threading and unthreading two or three times and check that they can be done smoothly.
- (5) Install the Drum Assembly on the unit.
- (6) After replacement, perform the adjustments in Section 4-42.



4-33. REPLACEMENT OF THE SUPPLY SIDE RAIL (O)

Mode: EJECT

Replacement procedure:

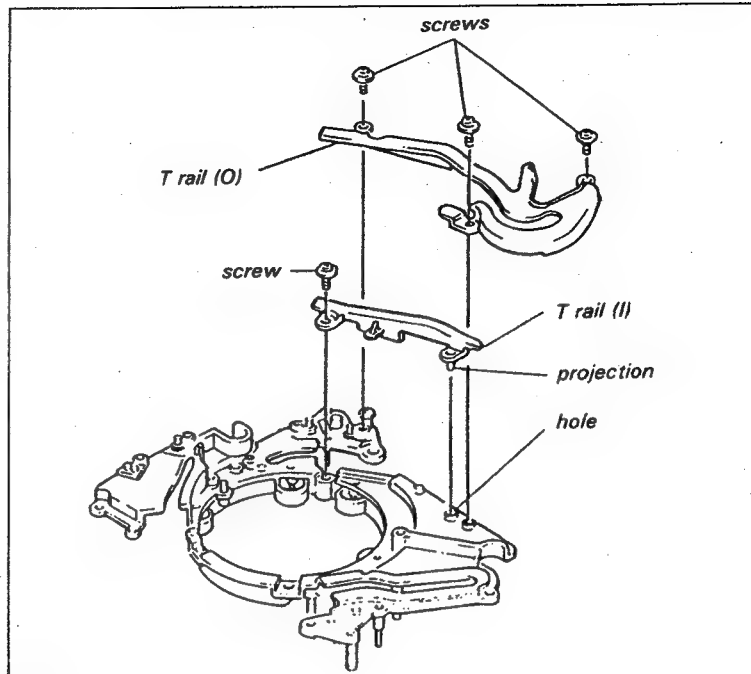
- (1) Remove the two screws of the S Rail (O) and remove it from the unit.
- (2) Install a new S rail (O) on the unit so that the clearance between the new S Rail (O) and S Rail (I) is 3.1 to 3.4mm.
- (3) Repeat threading and unthreading two or three times and check that they can be done smoothly.

4-34. REPLACEMENT OF THE TAKE-UP SIDE RAIL (I)

Mode: Threading end

Replacement procedure:

- (1) Remove the Drum Assembly from the unit.
(Refer to Section 4-6.)
- (2) Remove a fixing screw on the T Rail (I) and remove it from the unit.
- (3) Install the new T Rail (I) so that its projection is inserted into the chassis hole and the clearance between the new T Rail (I) and T Rail (O) is 3.1mm to 3.5mm.
- (4) Repeat threading and unthreading two or three times and check that they can be done smoothly.
- (5) Install the Drum Assembly on the unit.
- (6) After replacement, perform the adjustments in Section 4-42.



4-35. REPLACEMENT OF THE TAKE-UP SIDE RAIL(O)

Mode: Threading end

Replacement procedure:

- (1) Remove the three fixing screws of the T Rail (O) and remove it.
- (2) Install the new T Rail (O) on the unit so that the clearance between the new T Rail (O) and T Rail (I) is 3.1 to 3.5mm.
- (3) Repeat threading and unthreading two or three times and check that they can be done smoothly.

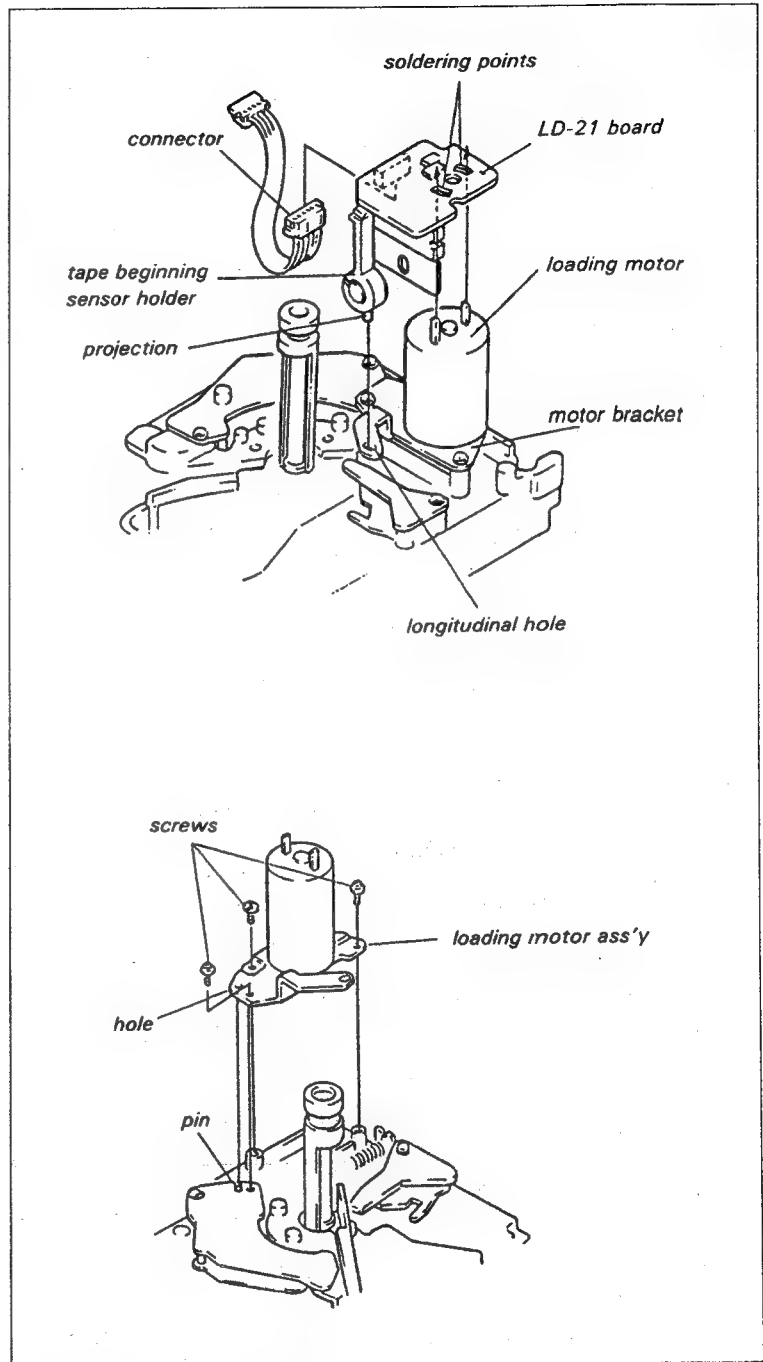
4-36. REPLACEMENT OF THE LOADING MOTOR

- When replacing the Loading Motor, replacement of the Loading Motor Assembly is recommended.

Mode: EJECT

Replacement procedure:

- (1) Remove the connector on the LD-21 Board of the upper portion of the Loading Motor.
- (2) Unsolder the two terminals, then remove the LD-21 Board from the Loading Motor.
- (3) Remove the three screws shown in the figure, then remove the Loading Motor Assembly from the unit.
- (4) After inserting the chassis pin into the hole of the new Loading Motor Assembly, install the Loading Motor Assembly, install the Loading Motor Assembly with the three fixing screws.
- (5) Assemble by reversing the Steps (1) and (2). When installing, make sure that the projection at the lower part of the Tape Beginning Sensor Holder on the LD-21 Board is in the longitudinal hole of the Motor Bracket.

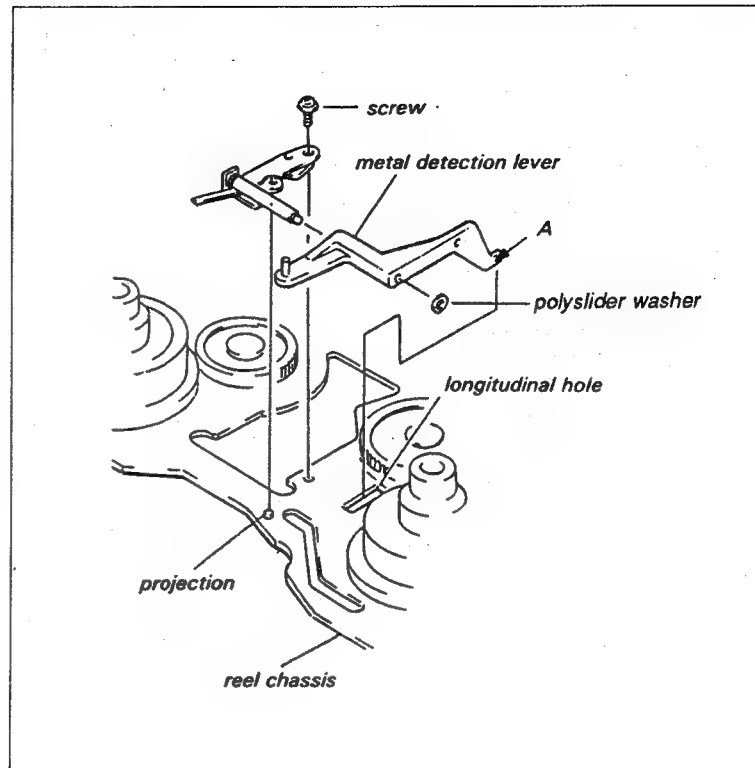


4-37. REPLACEMENT OF THE METAL DETECTION LEVER

Mode: EJECT

Replacement procedure:

- (1) Remove the Brake Slider referring to Section 4-17.
- (2) Remove a screw of the Metal Detection Lever and remove it from the unit.
- (3) Remove the polyslider washer of the Metal Detection Lever and replace it with the new one.
- (4) Install the Metal Detection Lever with the 1.2mm diameter polyslider washer.
- (5) Install the Metal Detection Lever on the chassis and fix it with the fixing screw so that portion A of the Metal Detection Lever is inserted into the longitudinal hole and the projection of the reel chassis is inserted into the hole of the Metal Detection Lever.
- (6) Install the Brake Slider referring to Section 4-17.



4-38. REPLACEMENT OF THE REEL SLIDER DRIVING GEAR

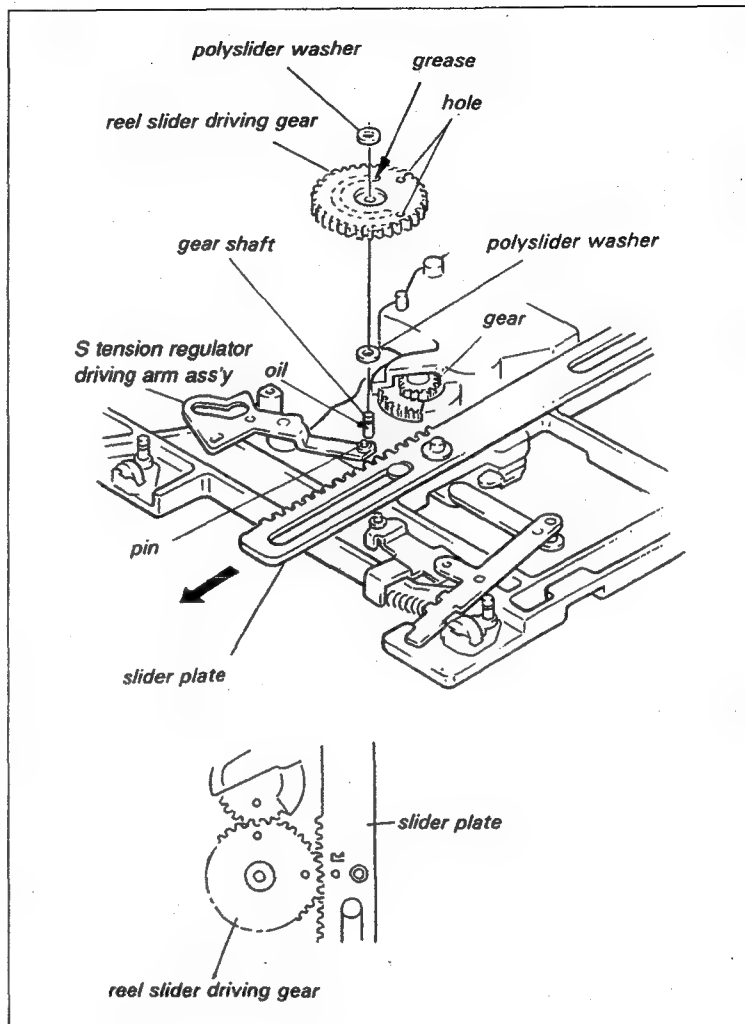
- When replacing this part, remove the Reel Chassis from the Mechanical Deck Block.
(Refer to Section 3-16.)

Tool: Sony grease
Sony oil

Mode: EJECT

Replacement procedure:

- (1) Remove the Reel Chassis. (Refer to Section 3-16.)
- (2) Remove the polyslider washer fixing the Reel Slider Driving Gear, then remove the Reel Slider Driving Gear and the polyslider washer (1.6mm dia.).
- (3) Clean the Gear Shaft with a cleaning piece moistened with cleaning fluid.
- (4) Install the polyslider washer (1.6mm dia.) on the shaft.
- (5) Apply a 1/4 drop of Sony oil on the shaft.
- (6) Smear a little Sony grease onto the groove of the new Reel Slider Driving Gear.
- (7) Move the Slider manually in the direction of the arrow until it stops.
- (8) Insert the Reel Slider Driving Gear into the shaft so that the pin of the S Tension Regulator Driving Arm Assembly is into the groove of the Driving Gear, and so that the positional relationship between the holes on the other gear and the slider plate and two holes of the Driving Gear as shown in the figure.
- (9) Push the polyslider washer (1.2mm dia.) onto the shaft and fasten the Reel Slider Driving Gear.
- (10) Install the Reel Chassis. (Refer to section 3-16.)



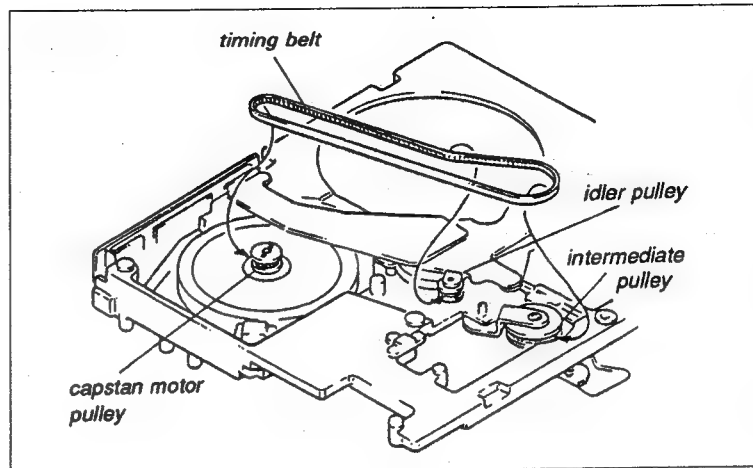
4-39. REPLACEMENT OF THE TIMING BELT

- When replacing this part, remove the Mechanical Deck Block from the unit. (Refer to Section 3-12.)

Mode: EJECT

Replacement procedure:

- (1) Remove the Mechanical Deck Block from the unit.
(Refer to Section 3-12.)
- (2) Remove the Timing Belt.
- (3) Place the new Timing Belt on the Capstan Motor Pulley, the Intermediate Pulley, then on the Idler Pulley in that order.



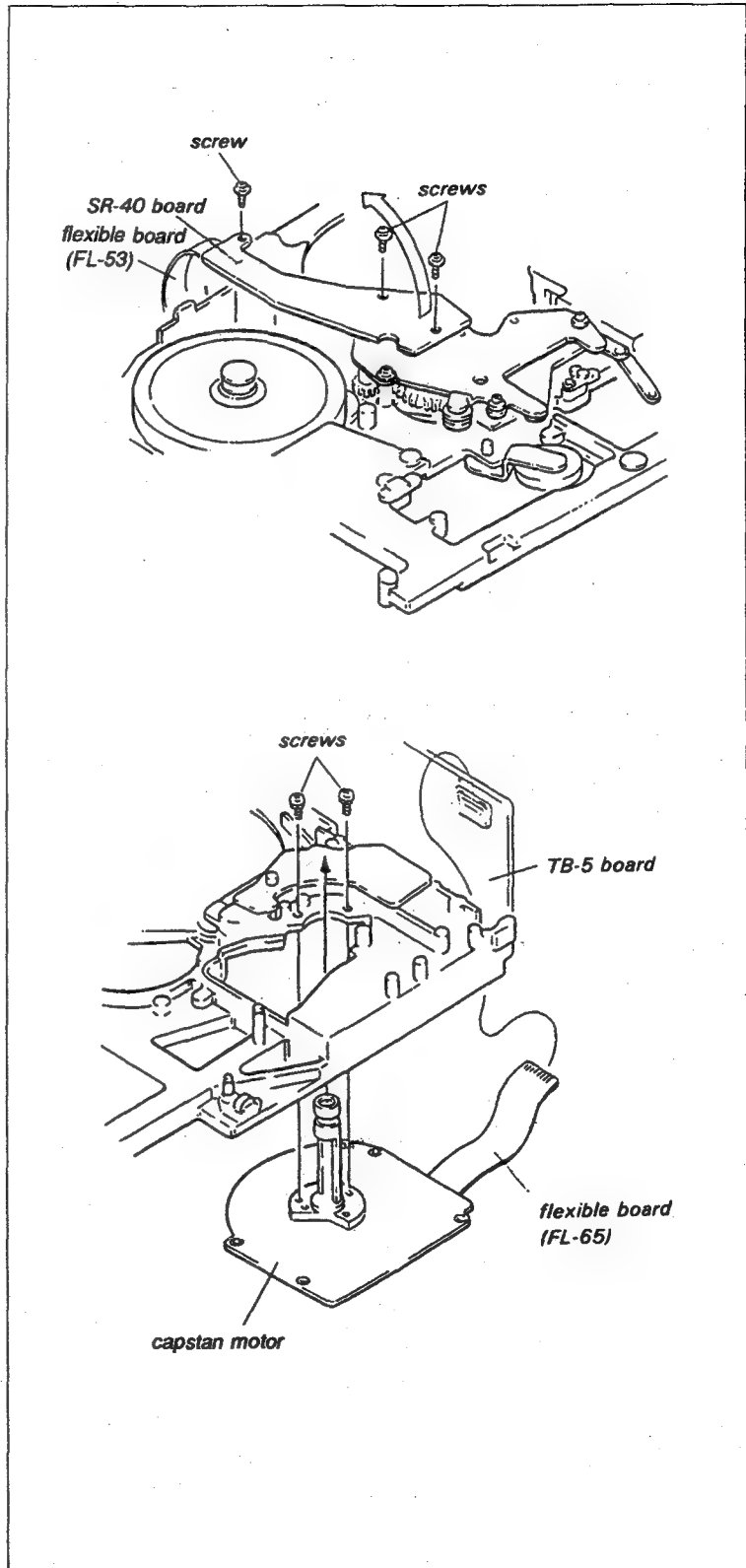
4-40. REPLACEMENT OF THE CAPSTAN MOTOR

- When replacing this part, remove the Mechanical Deck Block from the unit. (Refer to Section 3-12.)

Mode: EJECT

Replacement procedure:

- (1) Remove the Mechanical Deck Block from the unit.
(Refer to Section 3-12.)
- (2) Remove the three fixing screws of the SR-40 Board on the back of the Mechanical Deck Block and open the SR-40 Board on the flexible board side.
- (3) After removing flexible connector CN2 on the TB-5 Board from the front of the Mechanical Deck Block, remove the two fixing screws on the Capstan Motor, then remove the Capstan Motor from the unit.
- (4) Install the new Capstan Motor on the Mechanical Deck Block by reversing the Steps (1) through (3).
(NOTE) It is recommended for easy installing that the tip of the flexible board (FL-65 Board) makes flat.
- (5) Assemble by reversing the Step (2).

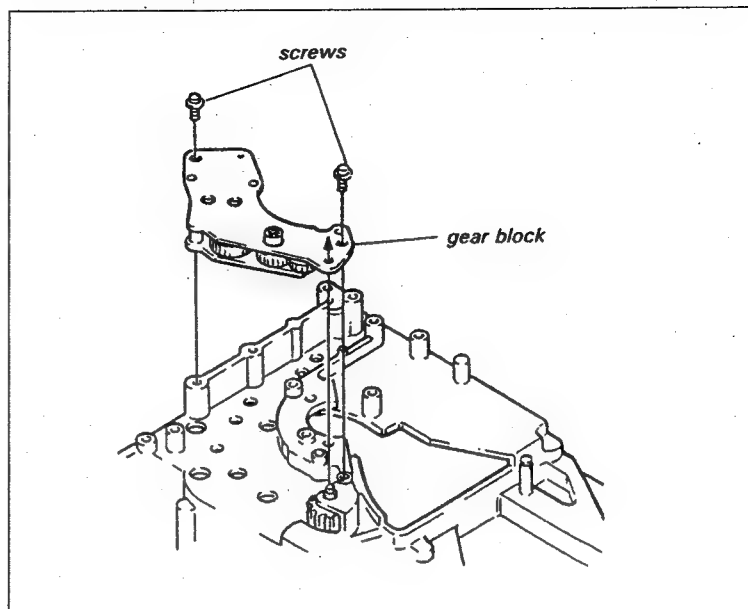


4-41. REPLACEMENT OF THE GEAR BLOCK

Mode: EJECT

Replacement procedure:

- (1) Remove the Loading Motor as described in Section 4-36, and remove the A/T Head Block as in Section 4-25.
- (2) Remove the two fixing screws as shown in the figure, remove the Gear Block, and replace with the new one.
- (3) Install the A/T Head Block and the Loading Motor Block as described in Sections 4-25 and 4-36.



4-42. ITEMS TO BE ADJUSTED AFTER THE MAIN PARTS REPLACEMENT

(Numbers in parenthesis refer to Section Nos.)

Replacement of the Upper Drum Assembly

Brush Position Adjustment (6-16) → Tracking Adjustment (6-8) → Tape Path Adjustment (PLAY mode)(6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Height Adjustment (6-9) → CTL Head Position Adjustment (6-10) → TC Head Position Adjustment (6-12) → Audio Head Height Adjustment (6-13) → TC Head Position Adjustment (check)(6-12) → Audio Head Phase Adjustment (6-14) → PB Switching Position Adjustment (6-15) → Video System Adjustment (8-5)

Replacement of the Drum Assembly

Tracking Adjustment (6-8) → Tape Path Adjustment (PLAY mode)(6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Height Adjustment (6-9) → CTL Head Position Adjustment (6-10) → TC Head Position Adjustment (6-12) → Audio Head Height Adjustment (6-13) → TC Head Position Adjustment (check)(6-12) → Audio Head Phase Adjustment (6-14) → PB Switching Position Adjustment (6-15) → Servo check (8-3) → Video System Adjustment (8-5)

Replacement of the S Reel Table

Tension Regulator Operating Position Adjustment (check)(5-8) → PLAY Back Tension Adjustment (check)(6-4)

Replacement of the Tension Regulator Band

Tension Regulator Operating Position Adjustment (5-8) → PLAY Back Tension Adjustment (6-4)

Replacement of the Tension Regulator

Tension regulator Operation Position Adjustment (5-8) → Tape Path Adjustment (PLAY mode)(6-1) → Tape Path Check (FF, REW mode)(6-2) → PLAY Back Tension Adjustment (6-4) → Tracking Adjustment (check)(6-8)

Replacement of the TG-7

Threading Position Check (Take-up side)(5-6) → Tape Threading/Unthreading Check (6-3) → Tape Path Adjustment (PLAY mode)(6-1) → Tape Path Check (FF, REW mode)(6-2) → Tracking Adjustment (check)(6-8)

Replacement of the Component Parts of the T Base

Threading Position Check (Take-up side)(5-6) → Tape Threading/Unthreading Check (6-3) → Tape Path Adjustment (PLAY mode)(6-1) → Tape Path Check (FF, REW mode)(6-2) → Tracking Adjustment (6-8) → Tape Path adjustment (PLAY mode)(check)(6-1) → Tape Path check (FF, REW mode)(6-2) → CTL Head Height Adjustment (check)(6-9) → CTL Head Position Adjustment (check)(6-10) → TC Head Position Adjustment (6-12) → Audio Head Height Adjustment (6-13) → TC Head Position Adjustment (check)(6-12) → Audio Head Phase Adjustment (6-14) → PB Switching Position Adjustment (6-15)

Replacement of the TG-4

Threading Position Check (Supply side)(5-5) → Tape Threading/Unthreading Check (6-3) → Tracking Adjustment (check)(6-8) → Tape Path Adjustment (PLAY mode) (check)(6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Height Adjustment (check)(6-9)

Replacement of the TG-5

Threading Position Check (Supply side)(5-5) → Tape Threading/Unthreading check (6-3) → Tracking Adjustment (6-8) → Tape Path Adjustment (PLAY mode)(check) (6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Height Adjustment (check)(6-9)

Replacement of the IR-2

Threading Position Check (Supply side)(5-5) → Impedance Roller Guide II Clearance Adjustment (5-7) → Tape Threading/Unthreading Check (6-3) → Tracking Adjustment (check)(6-8) → Tape Path Adjustment (PLAY mode)(check) (6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Height Adjustment (check)(6-9)

Replacement of the S Sub base

Threading Position Check (Supply side)(5-5) → Impedance Roller Guide II Clearance Adjustment (5-7) → Tape Threading/Unthreading Check (6-3) → Tracking Adjustment (check)(6-8) → Tape Path Adjustment (PLAY mode)(check) (6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Height Adjustment (check)(6-9) → CTL Head Position Adjustment (check)(6-10) → TC Head Position Adjustment (check)(6-12)

Replacement of the Component Parts of the S Base

Threading Position Check (Supply side)(5-5) → Impedance Roller Guide 2 Clearance Adjustment (check)(5-7) → Tape Threading/Unthreading Check (6-3) → Tracking Adjustment (check)(6-8) → Tape Path adjustment (PLAY mode)(check) (6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Height Adjustment (6-9) → CTL Head Position Adjustment (6-10) → TC Head Position Adjustment (6-12) → Audio Head Height Adjustment (6-13) → TC Head Position Adjustment (check)(6-12) → Audio Head Phase Adjustment (6-14) → PB Switching Position Adjustment (6-15)

Replacement of the CTL Head

Tracking Adjustment (check)(6-8) → Tape Path Adjustment (PLAY mode)(check) (6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Height Adjustment (6-9) → CTL Head Position Adjustment (6-10) → TC Head Position Adjustment (6-12)

Replacement of the Erase Head and the FE-4 Board

Tracking Adjustment (check)(6-8) → Tape Path Adjustment (PLAY mode)(check) (6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Position Adjustment (6-10) → TC Head Position Adjustment (6-12)

Replacement of the IR-1 Guide (Impedance Roller Guide), TG-1 Guide, IR-3 Guide, and the TG-10 Guide

Tape Path Adjustment (PLAY mode)(check)(6-1) → Tape Path Check (FF, REW mode) (6-2)

Replacement of the A/T Head

Audio Head Zenith Adjustment (6-11) → Tape Threading/Unthreading check (6-3) → Tracking Adjustment (check)(6-8) → Tape Path Adjustment (PLAY mode)(check) (6-1) → Tape Path Check (FF, REW mode)(6-2) → Audio Head Height Adjustment (6-13) → Audio Head Phase Adjustment (6-14) → Audio System Adjustment (8-4)

Replacement of the TG-8 Guide and the Slant Guide

Tape Threading/Unthreading Check (6-3) → Tracking Adjustment (check)(6-8) → Tape Path adjustment (PLAY mode)(check)(6-1) → Tape Path Check (FF, REW mode) (6-2) → Audio Head Height Adjustment (6-13) → Audio Head Phase Adjustment (6-14)

Replacement of the Pinch Arm Assembly and the Pinch Roller Sub assembly

Pinch Press Lever Position Adjustment (5-3) → Tape Threading/Unthreading Check (6-3) → Tape Path Check (Around the Pinch Roller)(6-5) → Tape Path Adjustment (PLAY mode)(6-1) → Tape Path Check (FF, REW mode)(6-2)

Replacement of the TG-11

Tape Threading/Unthreading Check (6-3) → Tape Path Check (Around the Pinch Roller)(6-5) → Tape Path Adjustment (PLAY mode)(6-1) → Tape Path check (FF, REW mode)(6-2)

Replacement of the S Rail (I)

Threading Position Check (Supply side)(5-5) → Tape Threading/Unthreading Check (6-3) → Tracking Adjustment (check)(6-8) → Tape Path Adjustment (PLAY mode) (check)(6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Height Adjustment (6-9) → CTL Head Position Adjustment (6-10) → TC Head Position Adjustment (6-12) → Audio Head Height Adjustment (6-13) → TC Head Position Adjustment (check)(6-12) → Audio Head Phase Adjustment (6-14) → PB Switching Position Adjustment (6-15)

Replacement of the T Rail (I)

Threading Position Check (Take-up side)(5-6) → Tape Threading/Unthreading Check (6-3) → Tracking Adjustment (check)(6-8) → Tape Path Adjustment (PLAY mode)(check)(6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Height Adjustment (6-9) → CTL Head Position Adjustment (6-10) → TC Head Position Adjustment (6-12) → Audio Head Height Adjustment (6-13) → TC Head Position Adjustment (check)(6-12) → Audio Head Phase Adjustment (6-14) → PB Switching Position Adjustment (6-15)

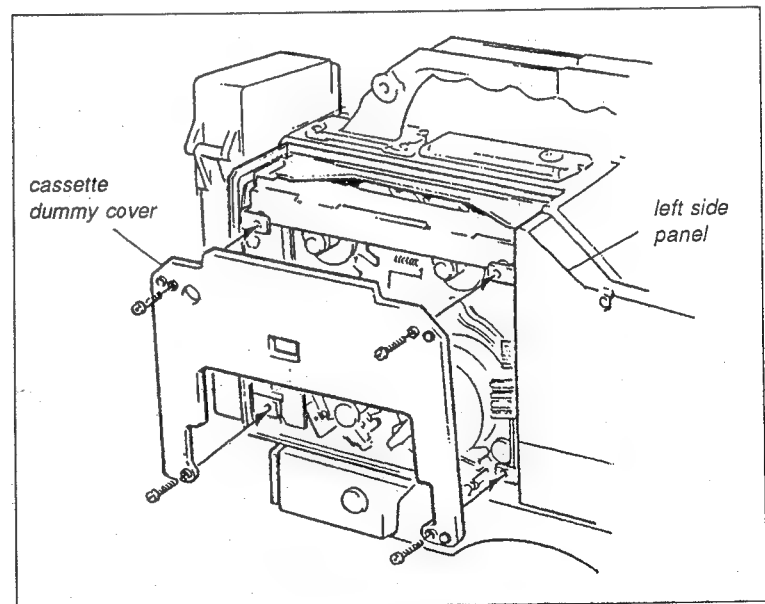
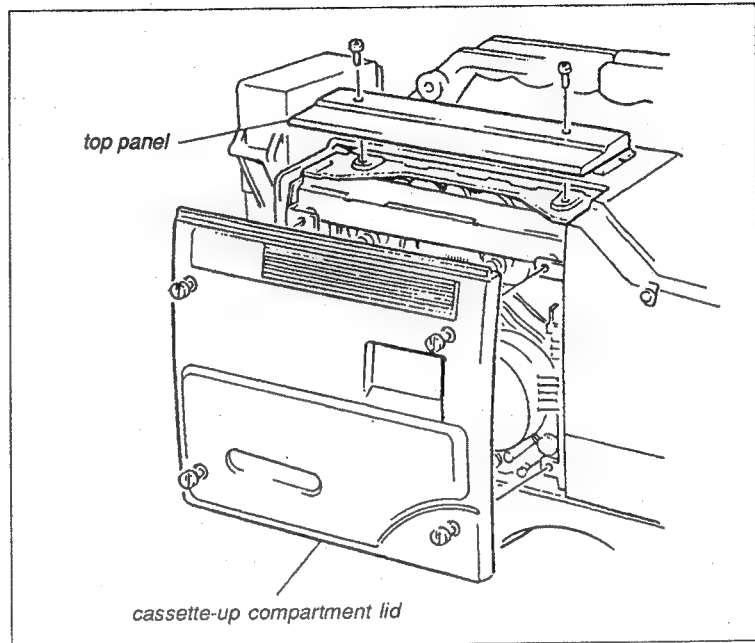
SECTION 5 LINK SYSTEM ALIGNMENT

(Preparations)

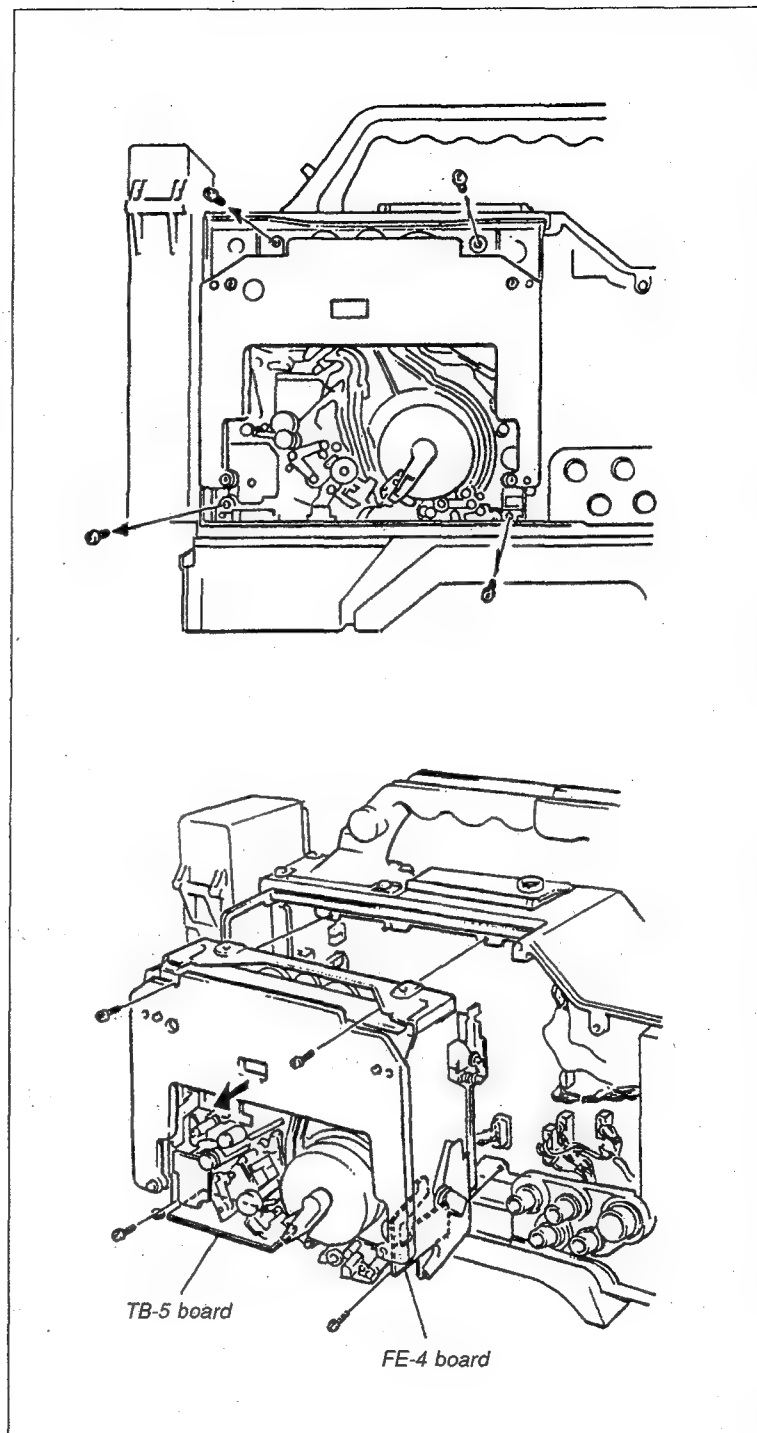
1. VTR's Mechanical Deck Block Adjustment

Adjust the VTR's mechanical deck block as follows.

- (1) Put the VTR into the threading end mode.
- (2) Remove the Top Panel.
- (3) Remove the Cassette-up Compartment Lid and install the Cassette Dummy Cover which is prepared for service.
- (4) Remove the Left Side Panel.



- (5) Remove the four screws which secure the mechanical deck block to the unit by using the hexagon bit.
- (6) Remove the mechanical deck block from the unit while removing the connectors below on the mother board.
Drum: CN41 and CN42
FE-4 board: CN43
TB-5 board: CN44
- (7) Connect the Extension Harness which is prepared for service to the above connectors on the mechanical deck block.
- (8) Connect the harness connector of the Extension Harness to the above connectors on the unit's mother board.

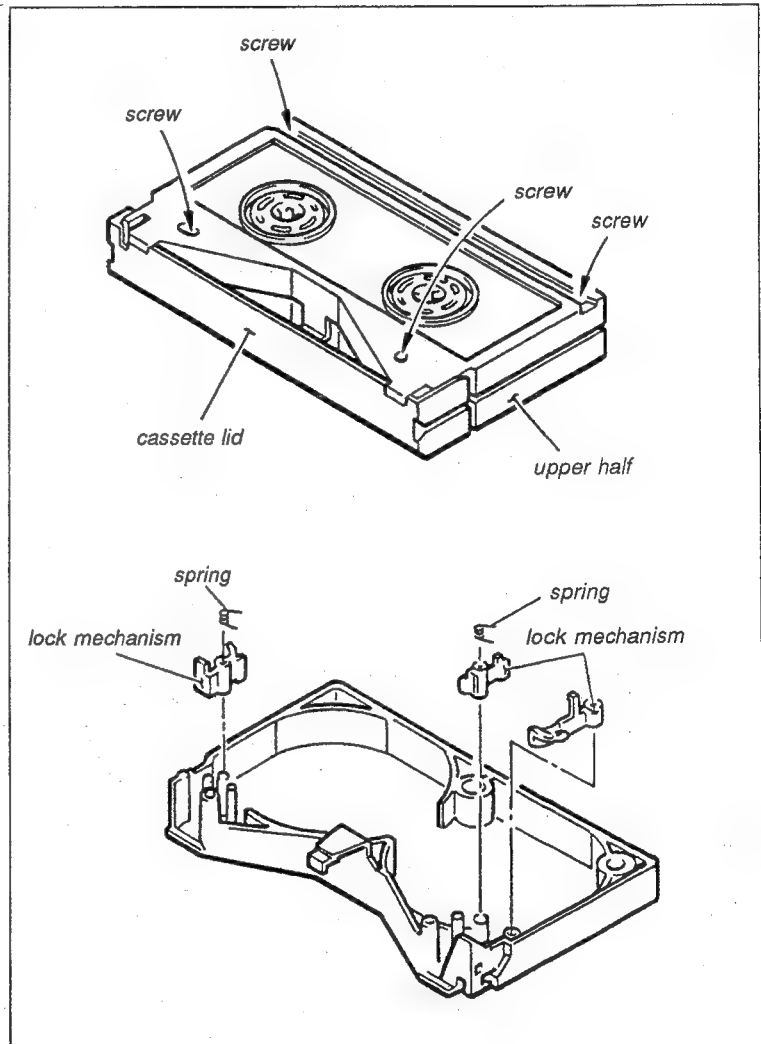


2. Creating the Blank Cassette/Cassette Tape without Lid/Alignment Tape without Lid

Since the VTR is designed to compact size, some mechanical checks and adjustments cannot be performed when a cassette tape lid or cassette tape is installed. Remove the cassette tape lid or cassette tape as follows:

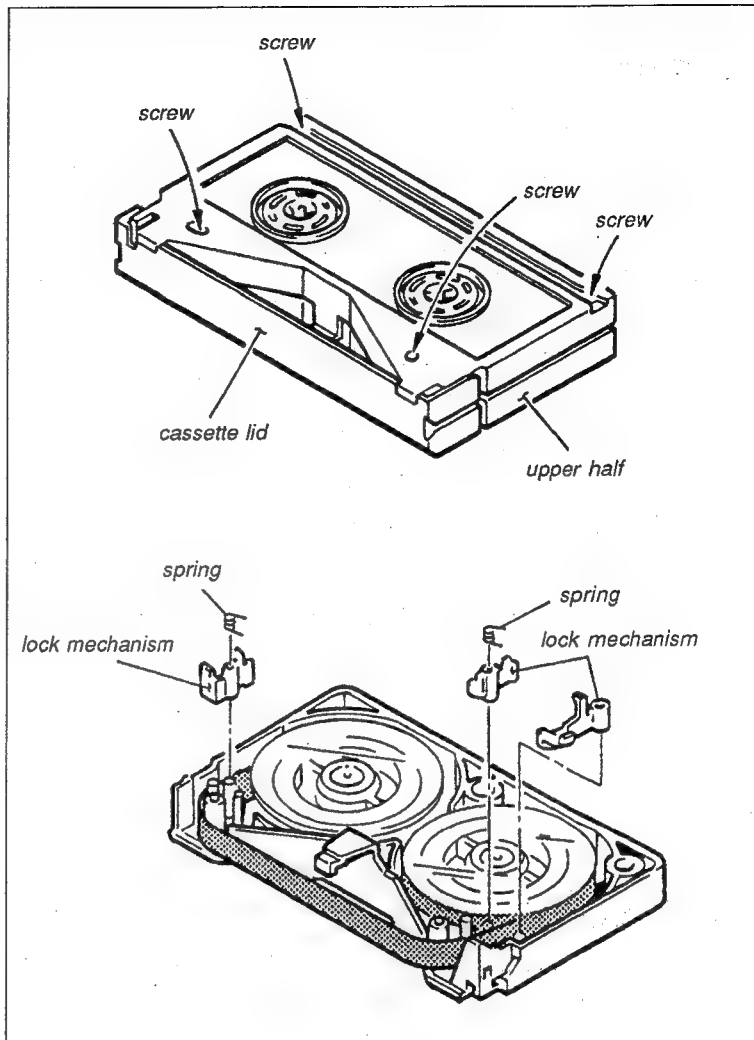
• Creating the blank cassette

- (1) Remove the four fixing screws on the back of a cassette tape and remove the upper half of the cassette tape as shown in the figure.
- (2) Remove the lock mechanism parts and the springs on the left and right.
- (3) Remove the cassette lid from the upper half.
- (4) Remove the cassette tape.
- (5) Install the upper half on the lower half with the four fixing screws from the back side.



• **Creating the Cassette Tape without Lid**

- (1) Remove the four fixing screws on the back of a cassette tape and remove the upper half of the cassette tape as shown in the figure.
- (2) Remove the lock mechanism parts and the springs on the left and right.
- (3) Remove the cassette lid from the upper half.
- (4) Install the upper half on the lower half with the four fixing screws from the back side.

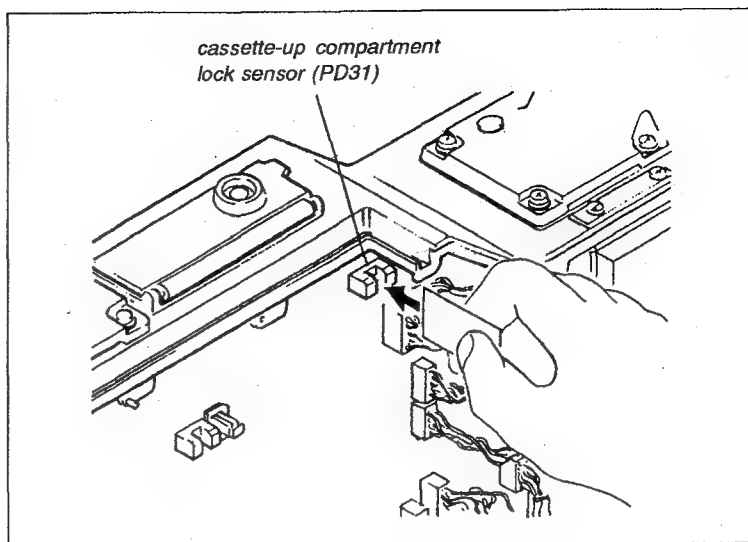


• **Creating the Alignment Tape without Lid**

- (1) Remove the four fixing screws on the back of a cassette tape and remove the upper half of the alignment tape as shown in the figure.
- (2) Remove the lock mechanism lock parts and the springs on the left and right.
- (3) Remove the cassette lid from the upper half.
- (4) Install the upper half on the lower half with the four fixing screws from the back side.

3. How to Operate the removed Mechanical Deck Block from the VTR

- (1) Push down the Cassette-up Compartment.
- (2) Insert a paper and so on into the Cassette-up Compartment Lock Sensor as Ref. No. PD31 near the CN52 on the MB-317AP board, and put the unit into the Cassette Lock Mode. The unit will start to thread by this operation.



5-1. GEAR ASSEMBLY POSITION ADJUSTMENT

Tool: Tension scale (50 g full scale)

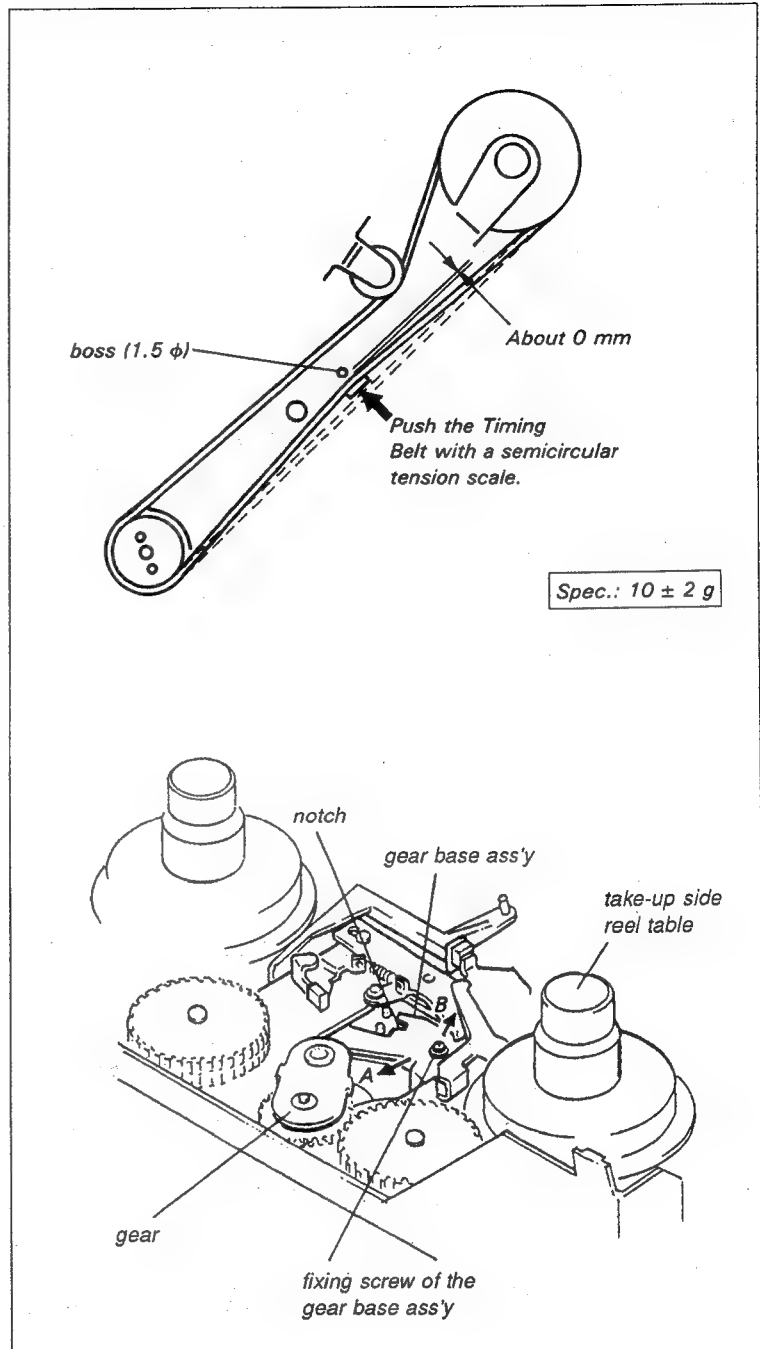
Mode: Any mode is acceptable. (Put the unit into the threading mode.)

Check procedure:

- (1) Push the Timing Belt in the direction of the arrow with a tension scale as shown in the figure.
- (2) Check that the reading of the tension scale meets the required specification, when the clearance between the boss and the Timing Belt is about 0 mm.

Adjustment procedure:

- (1) Loosen the fixing screw of Gear Base Ass'y by one or two turns.
- (2) Insert a flatblade screwdriver into the notch as shown in the figure, and move the Gear Base Ass'y in the direction as follows:
 - When the reading of the tension scale is smaller than the required specification : in the direction of A
 - When the reading of the tension scale is bigger than the required specification : in the direction of B
- (3) Tighten the fixing screw of the Gear Base Ass'y.
- (4) Perform steps (1) and (2). If the required specification is not satisfied, repeat the adjustment procedures (1) to (4).



5-2. PRESS LEVER POSITION CHECK

Tool: Blank cassette tape

Wire clearance gauge (0.1mm)

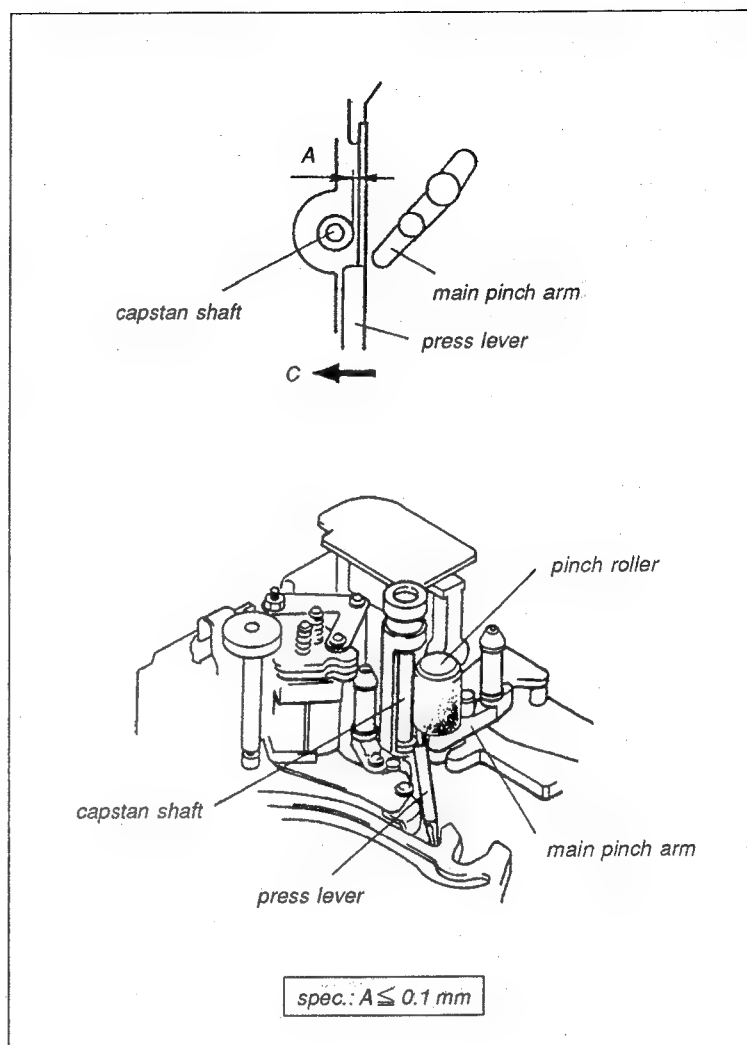
Setting: Remove the Cassette-up Compartment from the mechanical deck.

Mode: Play back the blank cassette tape and turn off the POWER switch.

Check procedure:

- (1) Insert the blank cassette tape, put the unit into the PLAY mode, then turn off the POWER switch.
- (2) When Pushing the Press Lever in the direction of the arrow C, check that clearance A between the capstan shaft and the Press Lever meets the required specification.

- When clearances A do not meet the required specification, perform the Pinch Press Lever Position Adjustment in Section 5-3.



5-3. PINCH PRESS LEVER POSITION ADJUSTMENT

Tool: Blank cassette tape

Wire clearance gauge (0.1, 0.2mm)

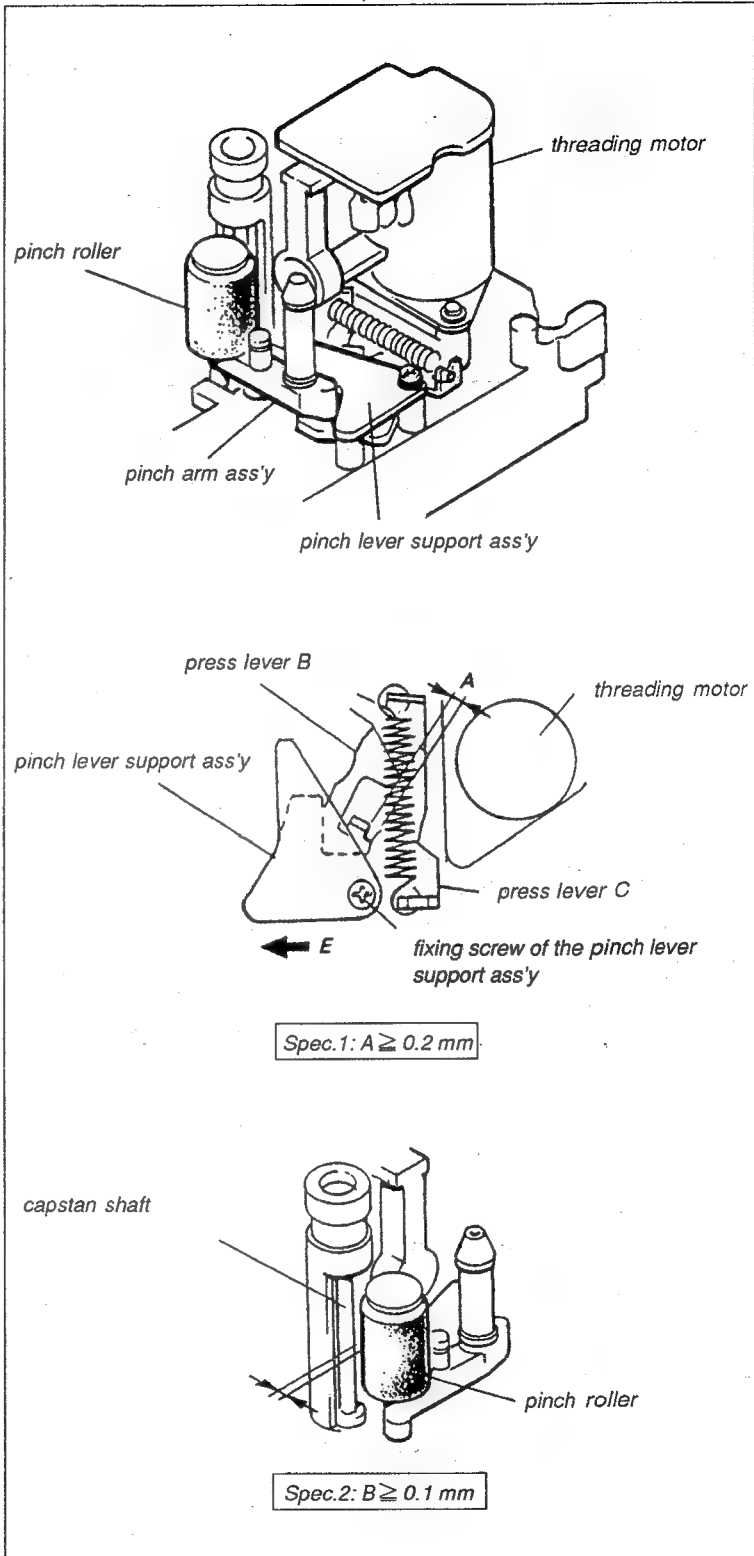
Mode: Play back and stop modes with the blank cassette tape.

Check procedure:

- (1) Insert the blank cassette tape and put the unit into the PLAY mode.
- (2) Confirm that clearance A between Press Levers (B) and (C) meets the required specification. (Spec. 1)
- (3) Put the unit into the STOP mode.
- (4) Confirm that clearance B between the pinch roller and the capstan shaft meets the required specification. (Spec. 2)

Adjustment procedure:

- Adjust so that clearances A and B meet the required specifications.
- (1) Insert the blank cassette tape and put the unit into the PLAY mode.
 - (2) Loosen the fixing screw of the Pinch Lever Support Ass'y by one turn.
 - (3) Adjust the assembly position so that clearance A between Press Levers (B) and (C) meets the required specification, when pushing the Pinch Lever Support Ass'y in the direction of arrow E.
 - (4) Tighten the fixing screw of the Pinch Lever Support Ass'y.
 - (5) Put the unit into the STOP mode and confirm that clearance B between the pinch roller and the capstan shaft meets the required specification.
 - When the specification is not satisfied, repeat Steps (1) through (5).



5-4. REEL FG OUTPUT LEVER CHECK

Tool: Blank cassette tape
Extension Board
Oscilloscope

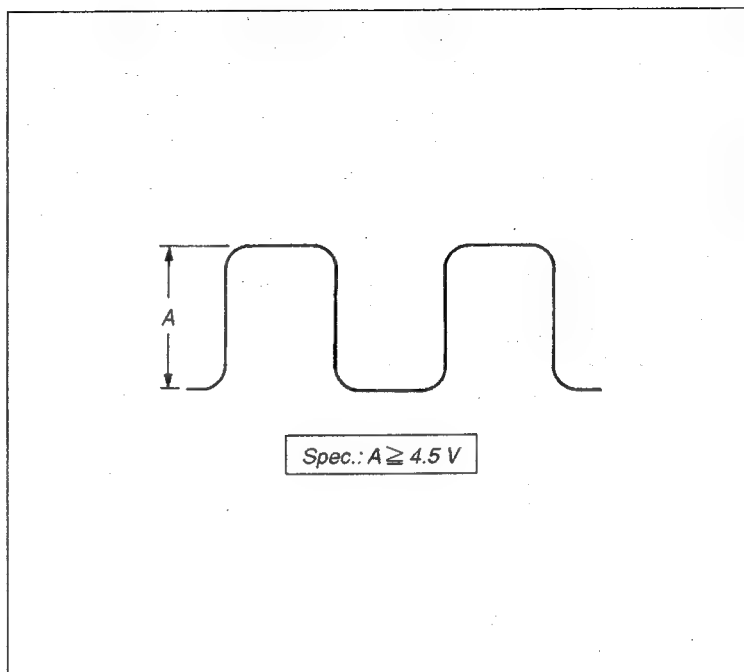
Setting: (1) Extend the SY-117CP Board with the Extension Board.
(2) Connect the oscilloscope to the measuring point below.
Take-up reel FG:
CN 1-3 / Extension Board
Supply reel FG:
CN 1-4 / Extension Board

Mode: FF/REW mode

Check procedure:

- (1) Insert the blank cassette tape and put the unit into the FF mode.
- (2) Confirm that the output waveform of the take-up reel FG meets the required specification.
- (3) Put the unit into the REW mode.
- (4) Confirm that the output waveform of the supply reel FG meets the required specification.

- When the FG output waveform does not meet the required specification, replace the reel table or the sensor.



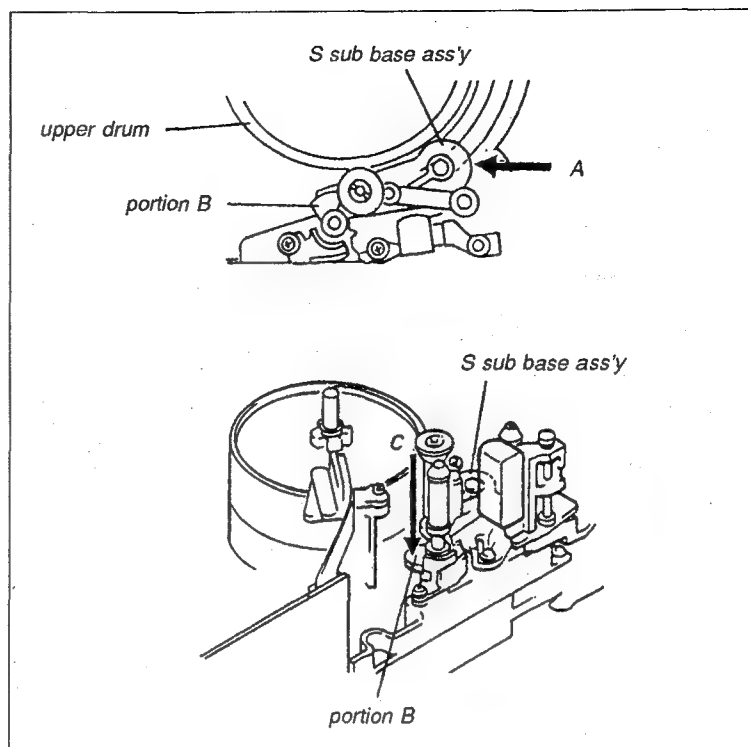
5-5. THREADING POSITION CHECK (SUPPLY SIDE)

Tool: Blank cassette tape

Mode: Put the unit into the threading completion mode and turn off the POWER switch.

Check procedure:

- (1) Insert the blank cassette tape, put the unit into the threading completion mode, then turn off the POWER switch.
- (2) When Pushing the S Sub Base Ass'y in the direction of the arrow A with a flatblade precision driver (2mm), confirm that it will not move.
- (3) When portion B of the S Sub Base ASS'y is pushed in the direction of the arrow C with a flatblade precision driver (2mm), confirm that it will not move in the vertical direction.
- (4) Confirm that the specifications are satisfied by repeating Steps (1) through (3) two or three times.



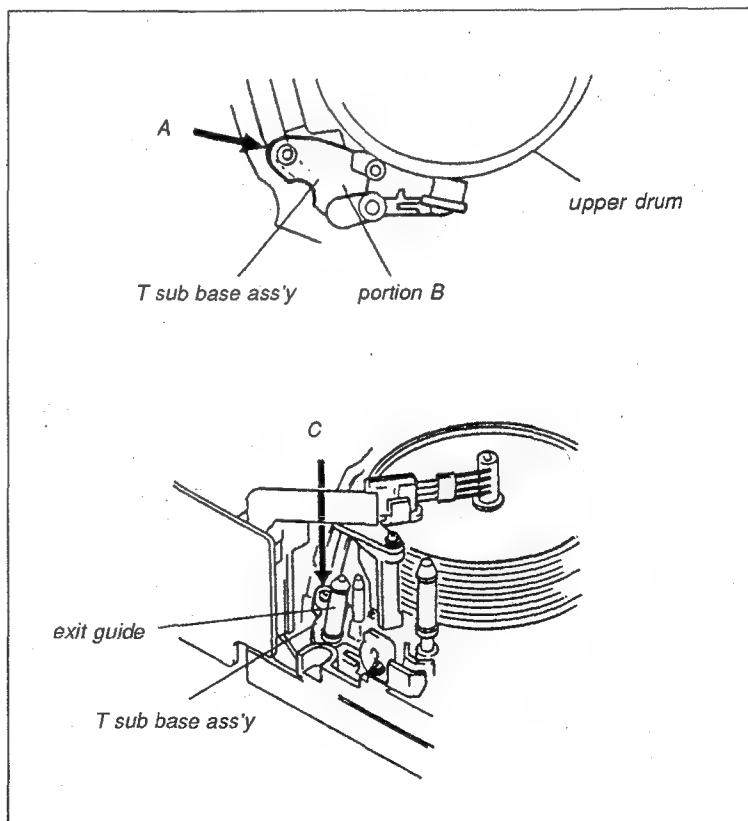
5-6. THREADING POSITION CHECK (TAKE-UP SIDE)

Tool: Blank cassette tape

Mode: Put the unit into the threading completion mode and turn off the POWER switch.

Check procedure:

- (1) Insert the blank cassette tape, put the unit into the threading completion mode, and then turn off the POWER switch.
- (2) When pushing the T Sub Base Ass'y in the direction of the arrow A with a flatblade precision driver (2mm), confirm that it will not move.
- (3) When pushing portion B of the T Sub Base Ass'y in the direction of the arrow C with a flatblade precision driver (2mm), confirm that it will not move in the vertical direction.
- (4) Confirm that the required specifications are satisfied by repeating Steps (1) through (3) two or three times.



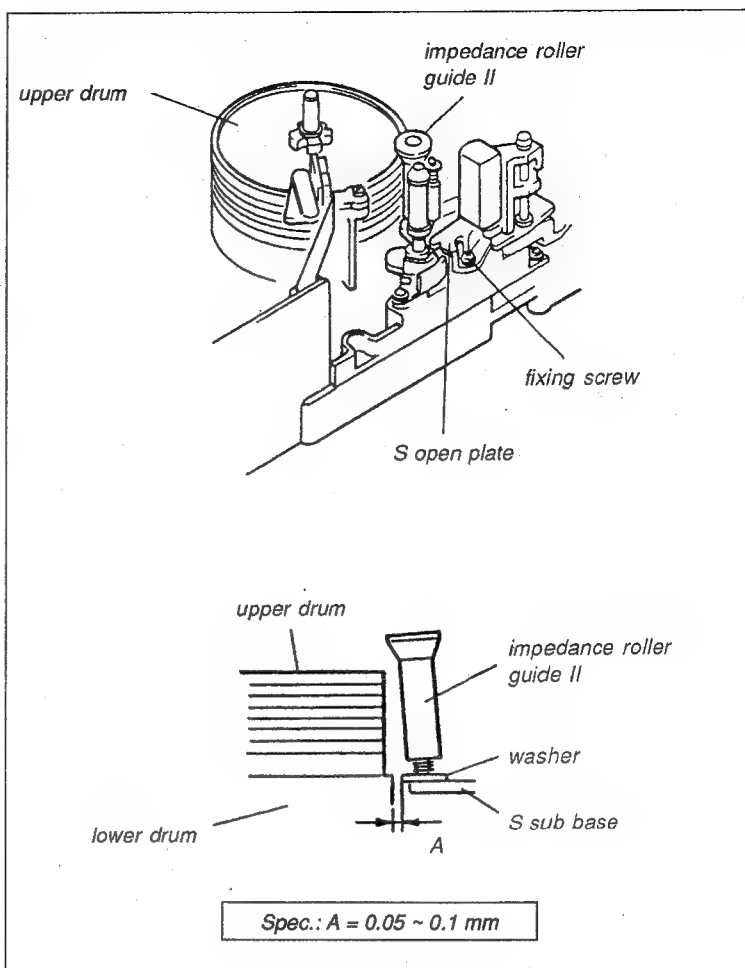
E LINK CYCLES ALLOCATED TO USER

Wire clearance gauge (0.2, 0.4mm)

Check procedure:

- Adjustment procedure:**

- (1) Loosen the fixing screw of the S Open Plate by one turn and adjust the S Open Plate position so that clearance A meets the required specification.
- (2) Perform Steps (1) and (2) in the check procedure and confirm that the required specification is satisfied.



5-8. TENSION REGULATOR OPERATING POSITION ADJUSTMENT

Tool: Cassette tape without a lid (BCT-30G)
(at the tape beginnings)

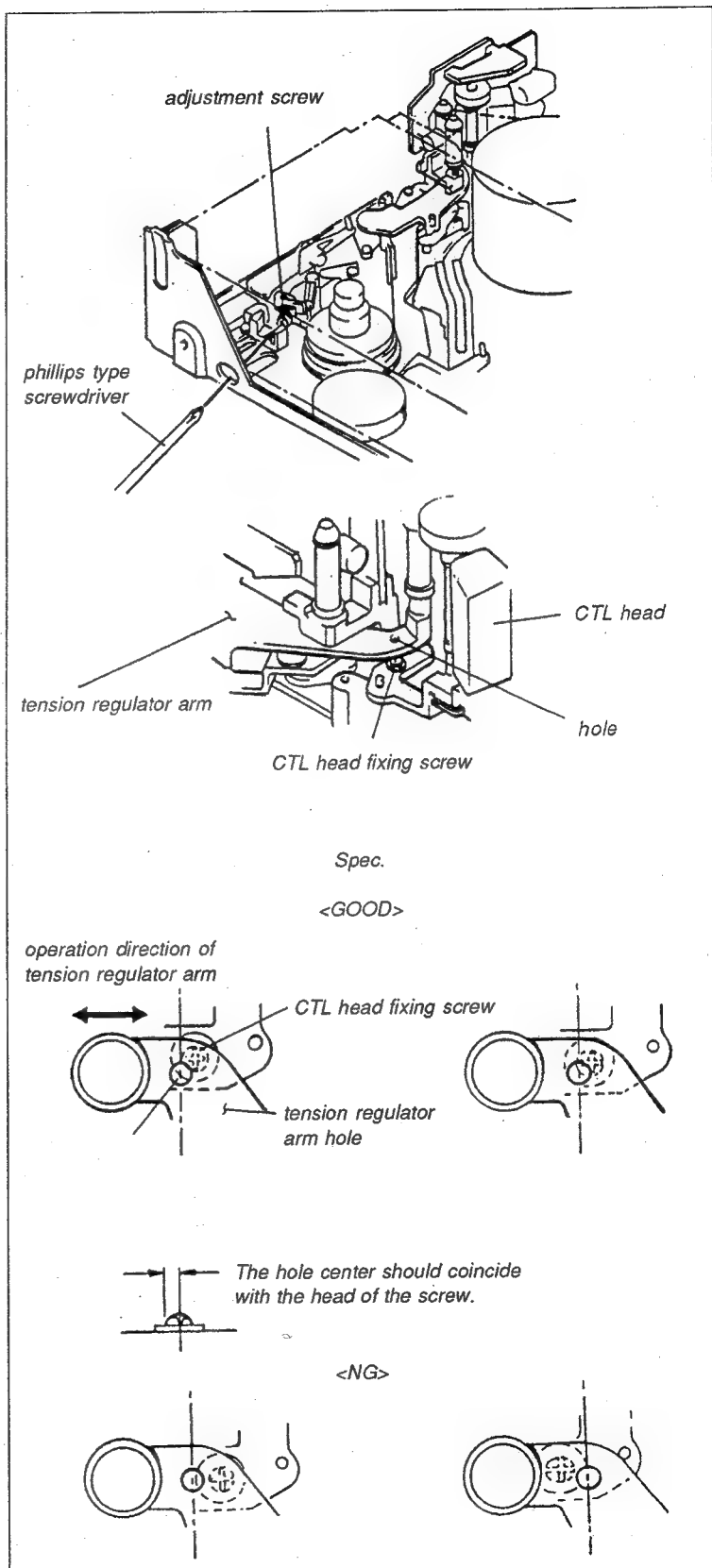
Mode: Play back the cassette tape without a lid.

Check procedure:

- (1) Confirm that the positional relationship between the Tension Regulator Arm's hole and the CTL Head Fixing Screw meets the required specification.

Adjustment procedure:

- (1) Insert a phillips type screwdriver through the hole shown in the figure.
- (2) Turn the adjustment screw so that the required specification is satisfied.



SECTION 6 TAPE RUN ALIGNMENT

(Preparations)

1. VTR's Mechanical Deck Block Adjustment

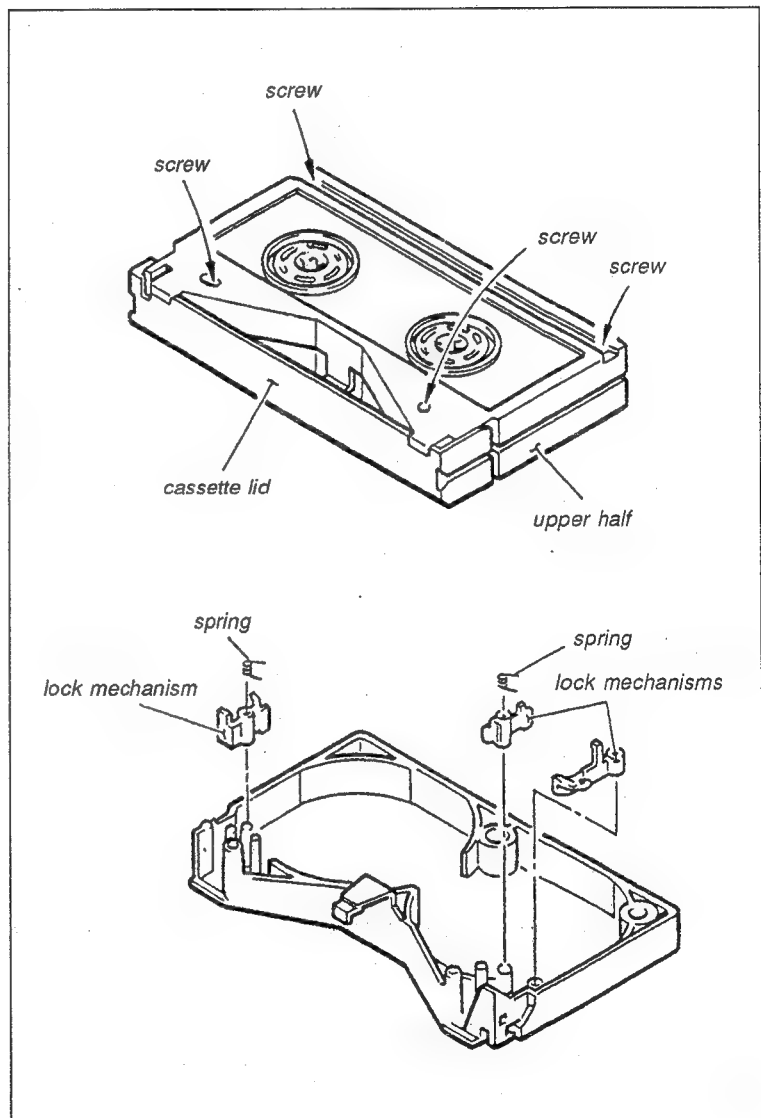
When the mechanical deck assy is removed from the unit for performing the tape run alignment, please refer to SECTION 5 LINK SYSTEM ALIGNMENT. 6-5. TAPE PATH ADJUSTMENT, 6-8. TRACKING ADJUSTMENT must be performed after mechanical deck assy is reinstalled in the unit.

2. Creating the Blank Cassette/Cassette Tape without Lid/Alignment Tape without Lid

Since the VTR is designed to compact size, some mechanical checks and adjustments cannot be performed when a cassette tape lid or cassette tape is installed. Remove the cassette tape lid or cassette tape as follows:

- Creating the blank cassette

- (1) Remove the four fixing screws on the back of a cassette tape and remove the upper half of the cassette tape as shown in the figure.
- (2) Remove the lock mechanism parts and the springs on the left and right.
- (3) Remove the cassette lid from the upper half.
- (4) Remove the cassette tape.
- (5) Install the upper half on the lower half with the four fixing screws from the back side.

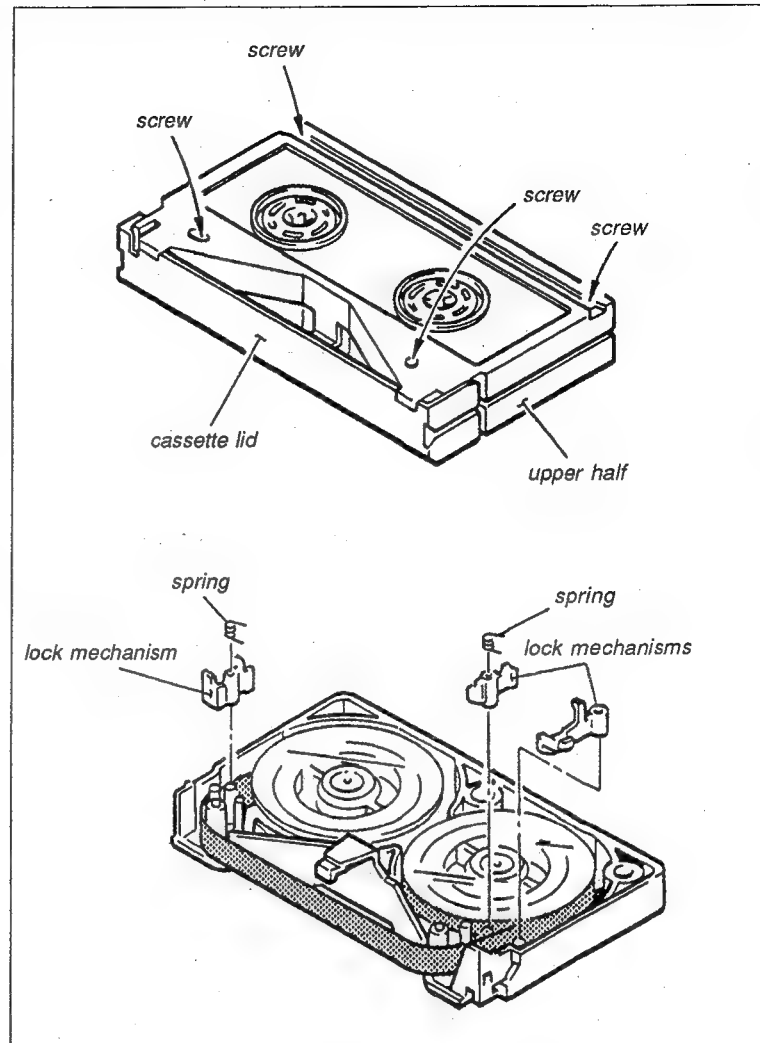


• **Creating the Cassette Tape without Lid**

- (1) Remove the four fixing screws on the back of a cassette tape and remove the upper half of the cassette tape as shown in the figure.
- (2) Remove the lock mechanism parts and the springs on the left and right.
- (3) Remove the cassette lid from the upper half.
- (4) Install the upper half on the lower half with the four fixing screws from the back side.

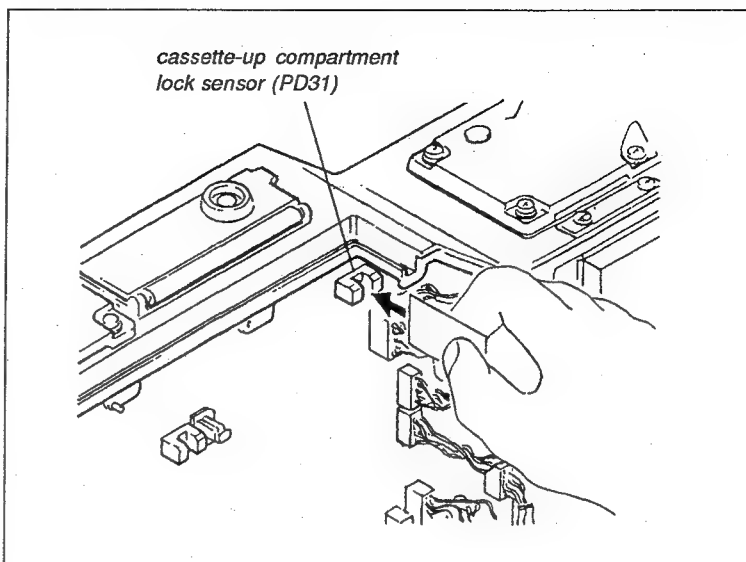
• **Creating the Alignment Tape without Lid**

- (1) Remove the four fixing screws on the back of a cassette tape and remove the upper half of the alignment tape as shown in the figure.
- (2) Remove the lock mechanism lock parts and the springs on the left and right.
- (3) Remove the cassette lid from the upper half.
- (4) Install the upper half on the lower half with the four fixing screws from the back side.



3. How to Operate the removed Mechanical Deck Block from the VTR

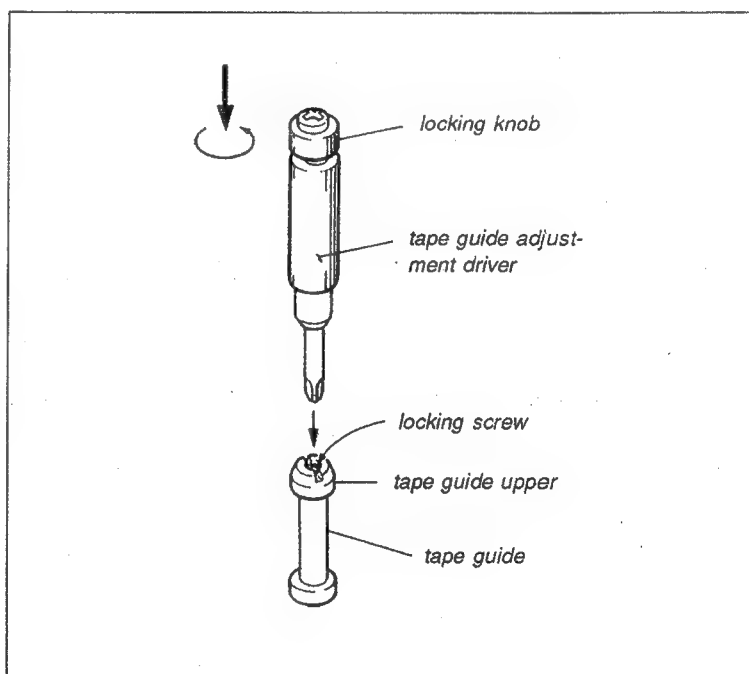
- (1) Push down the Cassette-up Compartment.
- (2) Insert a paper and so on into the Cassette-up Compartment Lock Sensor as Ref. No. PD31 near the CN52 on the MB-317AP board, and put the unit into the Cassette Lock Mode. The unit will start to thread by this operation.



4. Height Adjustment Procedure of the Tape Guide

When the height adjustment of the tape guide is performed in the Tape Run Alignment, use the tape guide adjustment driver (J-6321-500-A) prepared for the maintenance tool. After the height adjustment of the tape guide is completed, tighten the locking screw of the tape guide upper flange with the torque driver referring to Sec. 3-15.

- (1) Put the flatblade of the tape guide adjustment driver in the (-)slot of the tape guide.
- (2) Push down the locking knob of the adjustment driver and turn it counterclockwise about one turn.
- (3) Turn the adjustment driver and adjust the height of the tape guide.
- (4) After the adjustment is completed, tighten the locking screw of the tape guide upper flange referring to Sec. 3-15.
- (5) Apply the locking compound to the locking screw. (Never apply the locking compound to the tape running surface of the tape guide, upper and lower flanges.)



6-1. TAPE PATH ADJUSTMENT (PLAY MODE)

Tool: Cassette tape without a lid (BCT-30G)
Tape guide adjustment driver

Mode: Play back the cassette tape without a lid.

Check procedure:

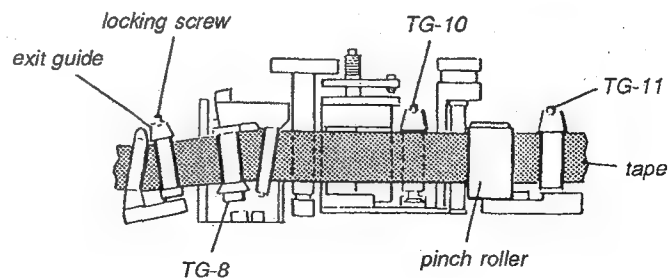
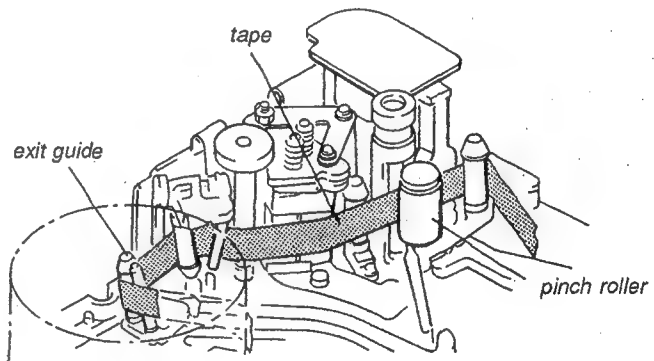
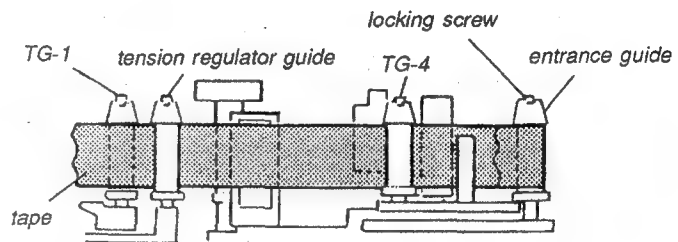
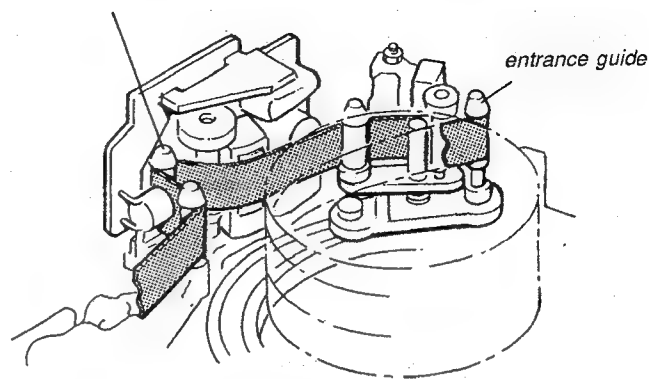
- (1) Insert the cassette tape without a lid (BCT-30G) and put the unit into the PLAY mode.
- (2) Confirm that the tape runs without curl at the flanges of the TG-1, Tension Regulator Guide, TG-4, and Entrance Guide.
- (3) Confirm that the tape runs without curl at the flanges of the Exit Guide, TG-8, TG-10, and TG-11.

Adjustment procedure:

• Tape curl at the Entrance Guide or at the lead at the drum entrance side.

- (1) Loosen the Upper Flange Locking Screw of the Entrance Guide with tape guide adjustment driver by one or two turns.
- (2) Turn and adjust the flange of the Entrance Guide so that no tape curl occurs at the Upper Flange of the Entrance Guide and the tape runs along the lead at the drum entrance side.
- (3) Temporarily tighten the Upper Flange Locking Screw of the Entrance Guide.
- (4) Check that the tape runs without curl at the flanges of the TG-1 Tension Regulator Guide, TG-4, and Entrance Guide.

tension regulator guide



- **Tape curl at the Exit Guide or at the lead at the drum exit side.**

- (5) Loosen the Upper Flange Locking Screw of the Exit Guide with a tape guide adjustment driver by one or two turns.
- (6) Turn with a tape guide adjustment driver and adjust the flange of the Exit Guide so that no tape curl occurs at the Upper Flange of the Exit Guide and the tape runs along the lead at the drum exit side.
- (7) Temporarily tighten the Upper Flange Locking Screw of the Exit Guide.
- (8) Insert the cassette tape without a lid (BCT-30G), put the unit into the PLAY mode, and confirm that the tape runs without curl at the flanges of each guide.

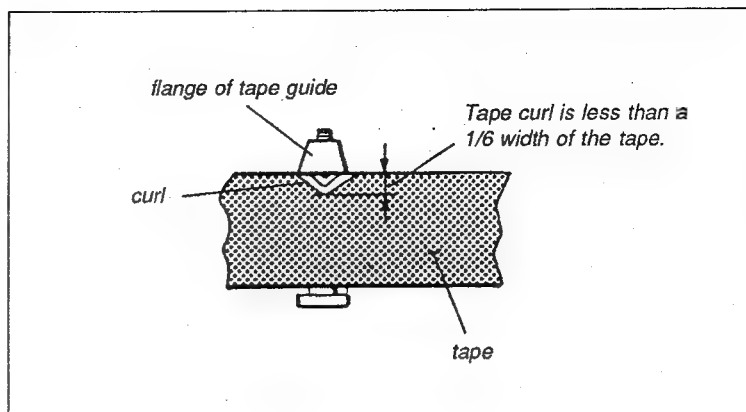
6-2. TAPE PATH CHECK (FF AND REW MODES)

Tool: Cassette tape without a lid (BCT-30G)
(at the complete tape end)

Mode: Fast-forward and rewind mode with the
cassette tape without a lid.

Check procedure:

- (1) Insert the cassette tape without a lid (BCT-30G), put the unit into the FF mode, and confirm that the tape runs without curl at the flanges of each guide. If occurs, curl less than one sixth of the tape width can be acceptable.
- (2) Put the unit into the REW mode and confirm that the tape runs without curl at the flanges of each guide. If occurs, curl less than one sixth of the tape width can be acceptable.



- When the tape curl does not satisfy the required specification, perform the Tape Path Adjustment (PLAY mode) in Section 6-1 again.

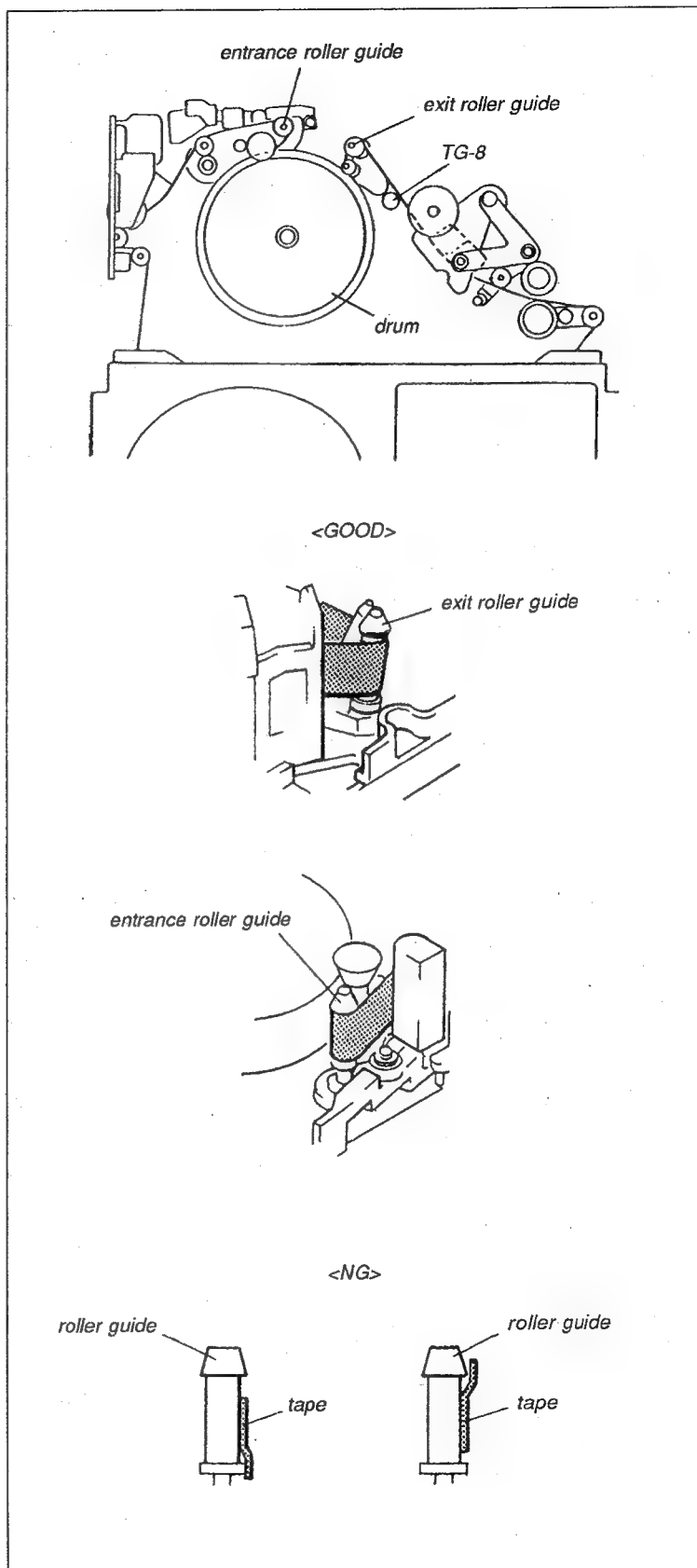
6-3. TAPE THREADING/UNTHREADING CHECK

Tool: Cassette tape without a lid (BCT-30G) (at the complete tape beginning)
Cassette tape without a lid (BCT-30G) (at the complete tape end)

Mode: Thread the cassette tape without a lid.

Check procedure:

- (1) Thread the cassette tape without a lid at the complete tape beginning. Confirm that the tape is threaded at the upper and lower flanges of the Entrance and Exit Guide Rollers without curl at this time.
- (2) Put up the mechanical deck block with the cassette tape in the upper position and drum in the lower position.
- (3) Check that the threading and unthreading operation is smooth
- (4) Repeat Steps (1) through (3) two or three times and confirm that the required specification is satisfied.
- (5) Thread the cassette tape without a lid at the complete tape end.
- (6) Check as in Step (1).
- (7) Check as in Steps (1) through (4).



6-4. PLAY BACK TENSION ADJUSTMENT

Tool: Cassette tape without a lid (BCT-30G)
(at the tape beginning)

Tentelometer: T2-H7-UMC

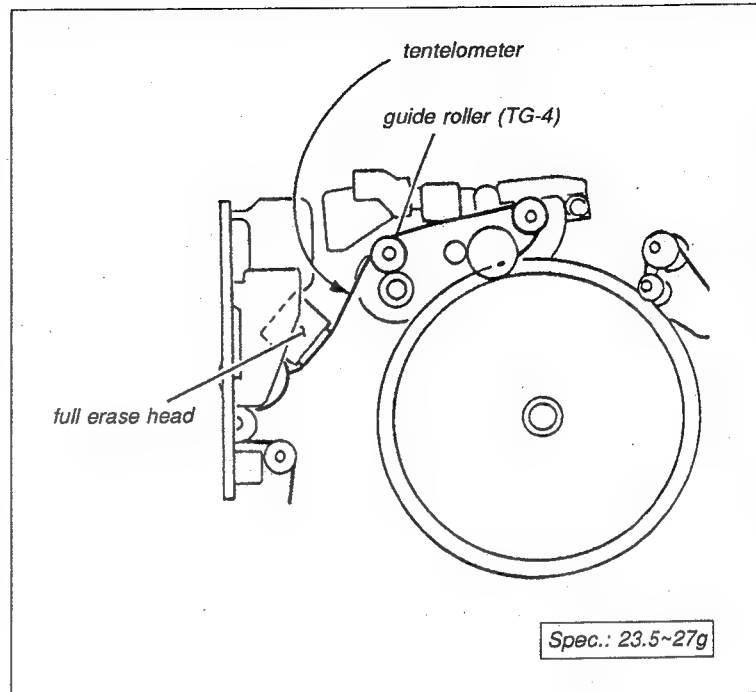
Mode: Play back the cassette tape without a lid

Check procedure:

- (1) Confirm that the tension regulator operating position meets the required specification in Sec. 5-8. Tension Regulator Operating Position Adjustment.
- (2) Insert the Tentelometer between Full Erase Head and Guide Roller (TG-4) as shown in the figure.
- (3) Confirm that the reading meets the required specification.

Adjustment procedure:

- (1) Adjust the tension regulator operating position so that the specification is satisfied within the limits required in Sec. 5-8.
- (2) When the required specification is not satisfied, replace the Supply Side Reel Table and Tension Regulator Band.
- (3) Perform the Sec. 5-8. Tension Regulator Operating Position Adjustment.
- (4) Perform the check procedure.



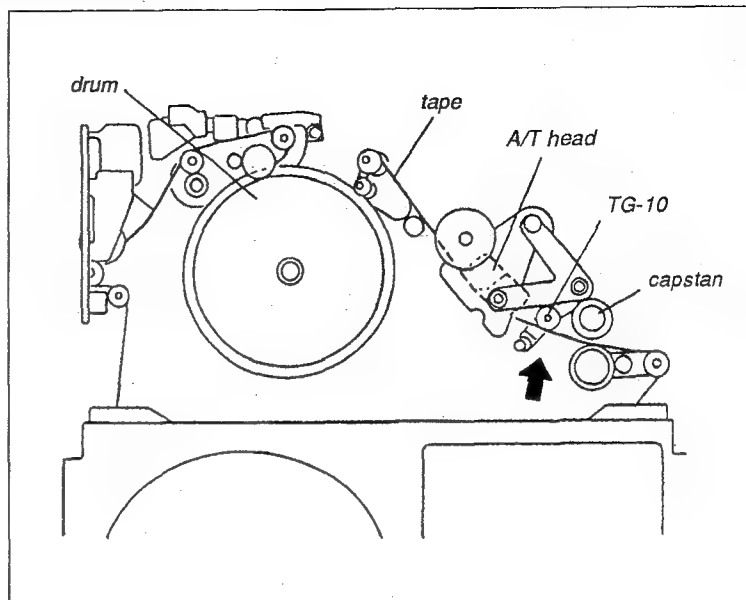
6-5. TAPE PATH ADJUSTMENT (AROUND THE PINCH ROLLER)

Tool: Cassette tape without a lid (BCT-30G)

Mode: Play back the cassette tape without a lid.

Check procedure:

- (1) Insert the cassette tape without a lid (BCT-30G) and put the unit into the PLAY mode.
- (2) Put the unit into the PLAY and STOP modes two or three times every two or three seconds and confirm that the tape path of the designated portion (between the A/T Head and capstan shaft) indicated by the arrow satisfies the specifications below.
 - No uneven tape tension occurs at the upper and lower edges of the tape.
 - When the pinch roller is pressed against the capstan shaft, any tape wrinkle occurring on the tape disappears within one second.
 - The tape is not damaged.
- (3) After unthreading is completed, put the unit into the threading and PLAY modes two or three times.
- (4) Put the unit into the PLAY mode and confirm that the tape path of the portion indicated by the arrow meets the required specifications in Step (2).



6-6. PLAY TORQUE CHECK

Tool: FWD torque cassette tape, SL-0003C

Mode: PLAY mode with torque cassette

Check procedure:

- (1) Put the unit into PLAY mode with a torque cassette.
- (2) After 2 or 3 seconds later, when the pinch roller is pressed against the capstan shaft, confirm that the indication of the meter on the T side of FWD torque cassette tape meets the required specification.

- When the required specification is not satisfied, replace the T Idler Ass'y.

*Spec.: PLAY torque
36±8g·cm*

6-7. REV TORQUE CHECK

Tool: FWD torque cassette tape, SL-0003C
Servo remote control tool

Preparation:

Connect the connector on the servo remote control tool to CN2 on the SV-97AP Board.

Mode: Insert the torque cassette tape and put the unit into the PLAY STOP REV mode.

Check procedure:

- (1) Insert the torque cassette tape and switch over the mode in the following steps.
(Put the unit into the REV mode finally.)

PLAY → STOP → REV

(When putting the unit into the PLAY and STOP modes, push the PLAY and STOP buttons on the VTR, and when putting into the REV mode, push the REV button on the servo remote control tool.)

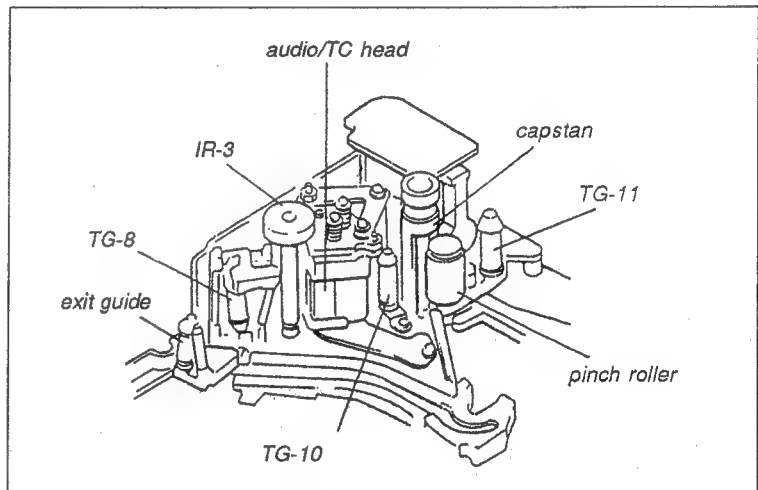
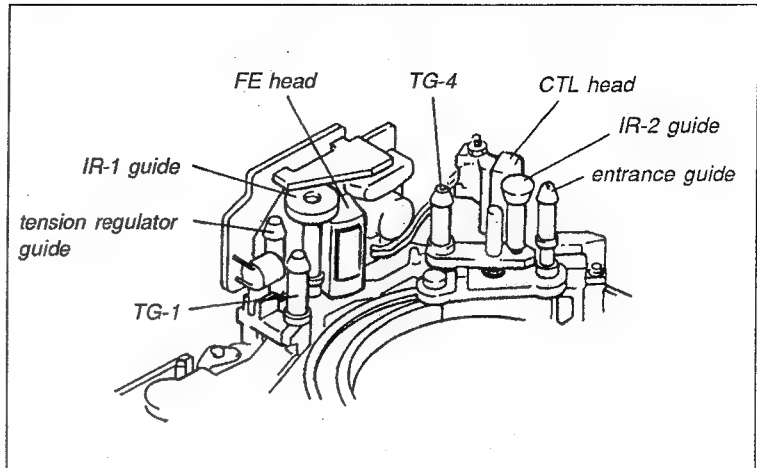
- (2) After 2 or 3 seconds later, confirm that the indication of the meter on the S side of FWD torque cassette tape meets the required specification.

- When the required specification is not satisfied, replace the S Idler Ass'y.

*Spec.: REV torque
55±15g·cm*

6-8. TRACKING ADJUSTMENT

- The tape guides and heads at the drum entrance side in this adjustment are illustrated.
- The tape guides and heads at the drum exit side in this adjustment are illustrated.
- Before performing the tracking adjustment, clean the tape guide, stationary head, drum, capstan shaft, and pinch roller described above with a cloth moistened with cleaning fluid.
- The BVW-300AP's drum mounts four video heads for Y and C heads, respectively. The video tracking adjustment is made with channel 1 of the Y head as reference.
- After the tracking adjustment is completed, perform the adjustment as follows:
 - Sec 6-1 Tape Path Adjustment (Play Mode)
 - Sec 6-2 Tape Path Check (FF and REW Modes)
 - Sec 6-9 CTL Head Height Adjustment
 - Sec 6-10 CTL Head Position Adjustment
 - Sec 6-12 TC Head Position Adjustment
 - Sec 6-12 TC Head Position Adjustment (Check)
 - Sec 6-13 Audio Head Height Adjustment
 - Sec 6-14 Audio Head Phase Adjustment



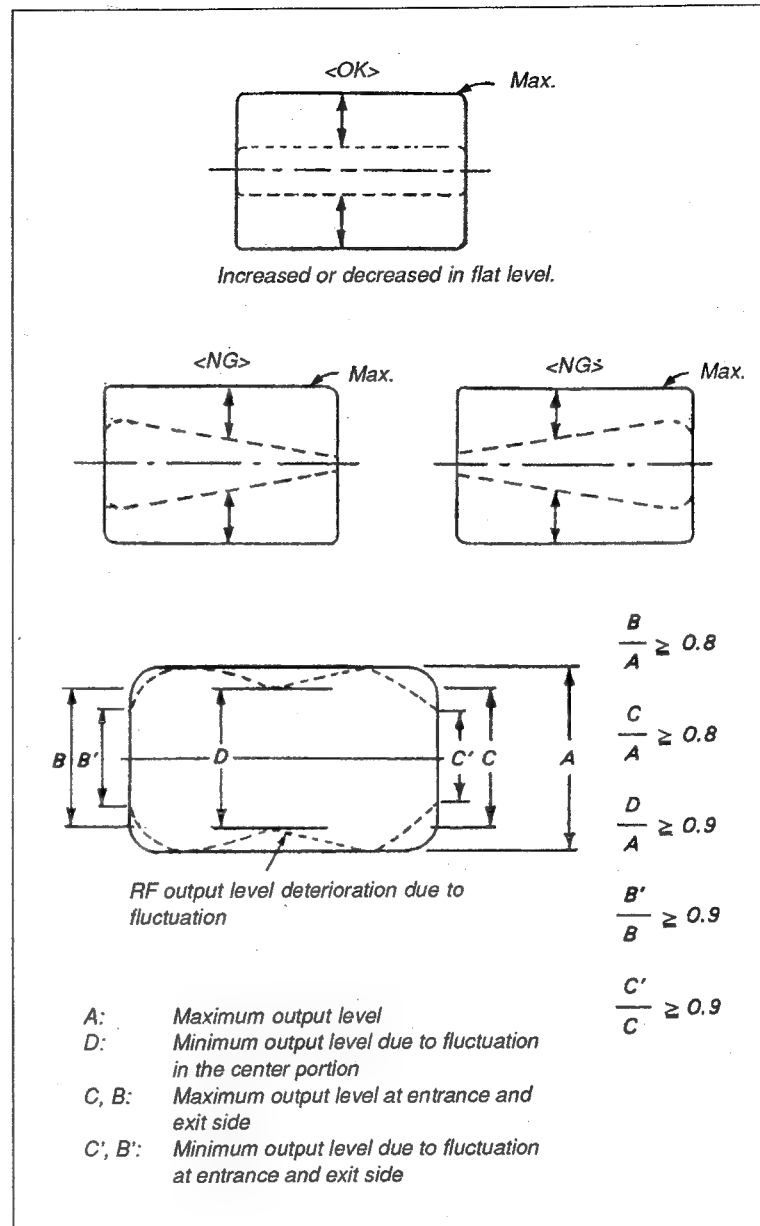
Tool: Alignment tape without a lid (CR2-1BPS)
 Dental mirror
 Oscilloscope
 Tape guide adjustment driver
 Servo remote control tool
 Extension board

Setting: (1) Extend the VP-24P Board with an extension board.
 (2) Connect the connector of the servo remote control tool to the CN2 on the SV-97AP Board.

Mode: Play back the alignment tape.

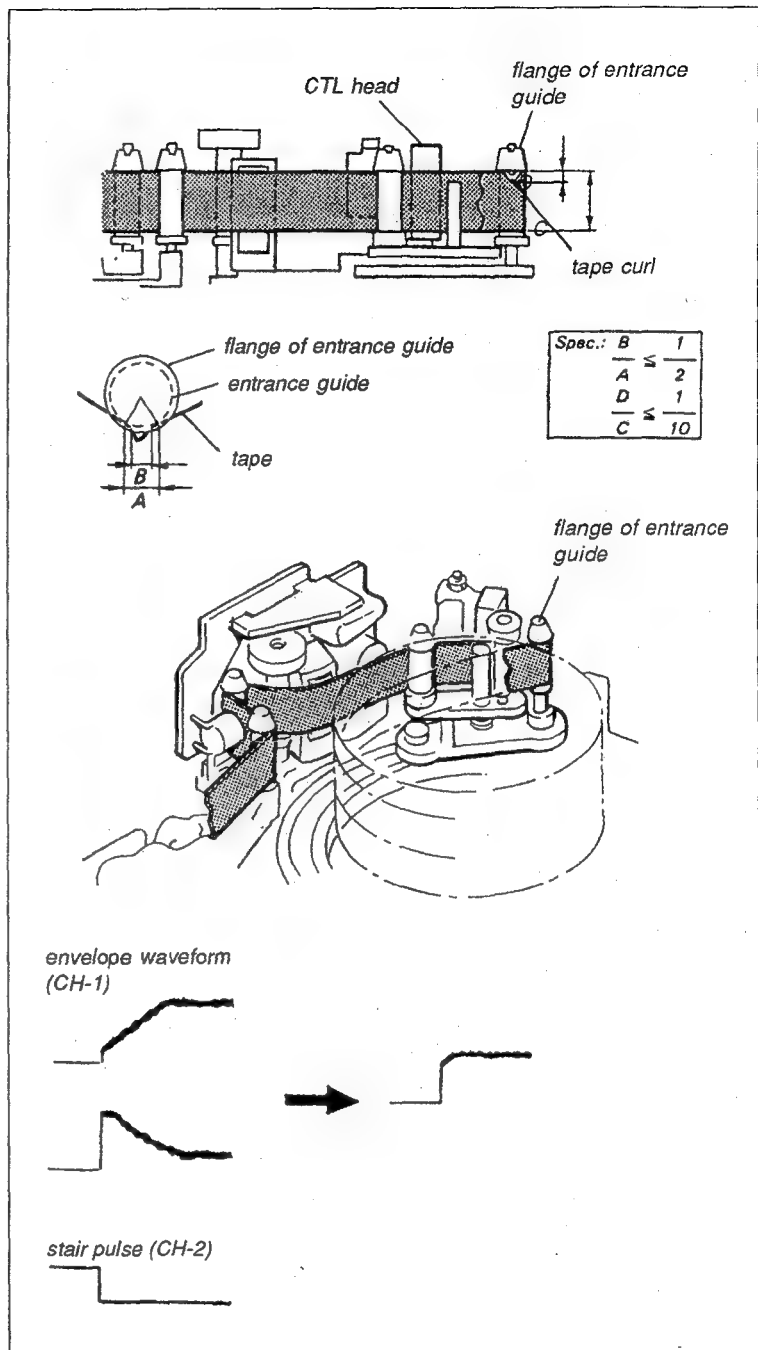
Check procedure:

- (1) Connect the oscilloscope as follows:
 CH-1: TP33 / Extension Board
 (waveforms of Y head in CH1 to CH4)
 CH-2: TP25 / Extension Board
 (Stair Pulse)
 TRIG: TP25 / Extension Board
 (Stair Pulse)
- (2) Insert the alignment tape CR2-1BPS and put the unit into the PLAY mode.
- (3) Confirm that the waveforms of channels 1 through 4 of the Y head meets the required specifications of the Steps (4) and (5).
- (4) Confirm that the RF envelope waveform maintains flat while the amplitude increases and decreases, when pushed the (+) or (-) button of the tracking control on a servo remote control tool.
- (5) Check that the RF envelope waveform head-to-tape contact and fluctuation are within the specification at the maximum amplitude.
- (6) Connect the oscilloscope as follows:
 CH-1: TP31 / Extension Board
 (waveforms of CH1 through CH4 of C head)
 CH-2: TP25 / Extension Board
 (Stair Pulse)
 TRIG: TP25 / Extension Board
 (Stair Pulse)
- (7) Confirm that the waveforms of channels 1 through 4 of the C head meets the required specifications of the Steps (4) and (5).

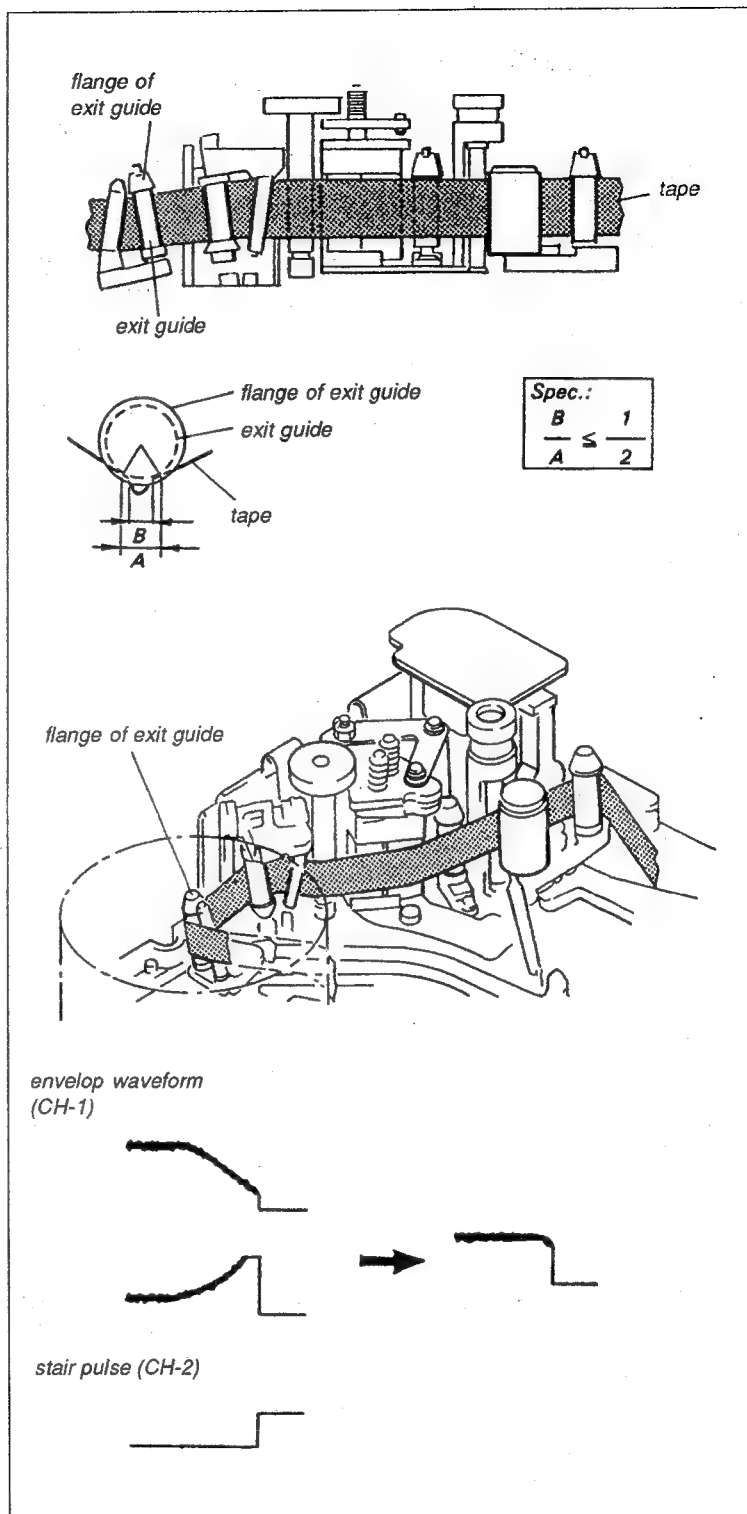


Adjustment procedure:

- (1) Connect the oscilloscope as follows:
CH-1: TP33 / Extension Board
CH-2: TP25 / Extension Board
TRIG: TP25 / Extension Board
 - (2) Insert the alignment tape CR2-1BPS and put the unit into the PLAY mode.
 - (3) Push the (+) or (-) button of the tracking control on the servo remote control tool so that the RF envelope waveform is made 70 to 80% of the maximum amplitude.
- To make a tracking adjustment at entrance side, perform Steps (4) through (8) plus Steps (14) and after. To make a tracking adjustment at exit side, perform Steps (9) through (13) plus Steps (14) and after.
- (4) Loosen the Upper Flange Locking Screw of the Entrance Guide by one or two turns with the tape guide adjustment driver.
 - (5) Turn the upper flange of the Entrance Guide with the tape guide adjustment driver and adjust so that the required specifications below are satisfied.
 - (i) The RF envelope waveform at entrance side is flat.
 - (ii) No tape curl occurs at the upper flange of the Entrance Guide.
 - (iii) The tape touches the lead at the drum entrance side.
 - (6) Tighten the Upper Flange Locking Screw of the Entrance Guide with the tape guide adjustment driver.
 - (7) Put the unit into the EJECT and PLAY modes two or three times and confirm that the required specifications in Step (5) are satisfied.



- (8) When raised the mechanical deck with the cassette tape in the upper position and the drum in the lower position, check that the RF envelope waveform at the entrance side meets the required specification.
- (9) Loosen the Upper Flange Locking Screw of the Exit Guide by one or two turns with a tape guide adjustment driver.
- (10) Turn the upper flange of the Exit Guide with the tape guide adjustment tool and adjust so that the required specifications below are satisfied.
 - (i) The RF envelope waveform at exit side make flat.
 - (ii) No tape curl occurs at the upper flange of the Exit Guide.
 - (iii) The tape touches the lead at the drum exit side.
- (11) Tighten the Upper Flange Locking Screw of the Exit Guide with the tape guide adjustment driver.
- (12) Repeat the EJECT and PLAY modes two or three times and confirm that Step (10) is satisfied.
- (13) When raised the mechanical deck with the cassette tape in the upper position and the drum in the lower position, confirm that the RF envelope waveform at the exit side meets the required specification.
- (14) Connect the oscilloscope as follows:
 CH-1: TP31 / Extension Board
 CH-2: TP25 / Extension Board
 TRIG: TP25 / Extension Board
- (15) When pushed the (+) or (-) button of the tracking control on the servo remote control tool, confirm that the RF envelope waveform is increased or decreased in a flat level.
- (16) Perform the adjustments as follows:
 Sec 6-1 Tape Path Adjustment (Play Mode)
 Sec 6-2 Tape Path Check (FF and REW Mode)



6-9. CTL HEAD HEIGHT ADJUSTMENT

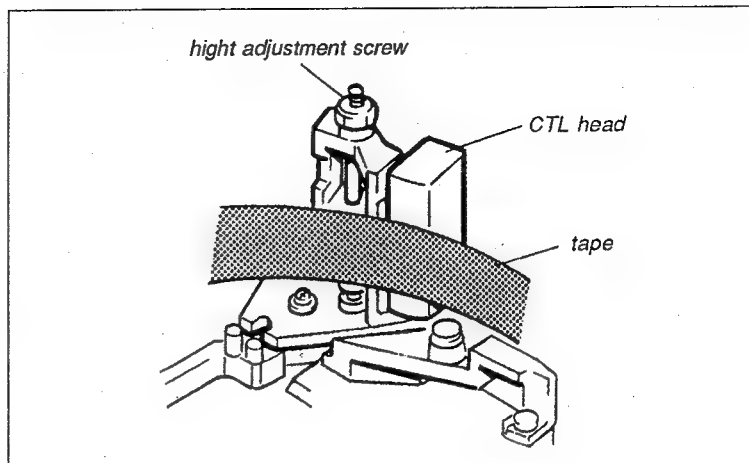
Tool: Alignment tape without a lid (CR8-1APS)
Oscilloscope
Extension Board

Setting: (1) Extend the SV-97AP Board with an extension board.
(2) Connect the oscilloscope as follows:
CH-1:TP38 / Extension Board

Mode: Play back the alignment tape.

Adjustment procedure:

- (1) Play back a 1 kHz audio signal which is recorded on the CTL track of the alignment tape.
- (2) Turn the hight adjustment screw so that the output waveform is maximized.



6-10. CTL HEAD POSITION ADJUSTMENT

- The BVW-300AP's drum mounts four video heads for Y and C heads, respectively. The CTL head position adjustment is made with channel 1 of the Y head as reference.

Tool: Alignment tape without a lid (CR2-1BPS)
Oscilloscope
Extension Board
Servo remote control tool

Setting: (1) Extend the VP-24P Board with an extension board.
(2) Connect the connector of the servo remote control tool to the CN2 of the SV-97AP Board.
(3) Connect the oscilloscope as follows:
CH-1: TP33 / Extension Board
CH-2: TP25 / Extension Board
TRIG: TP25 / Extension Board

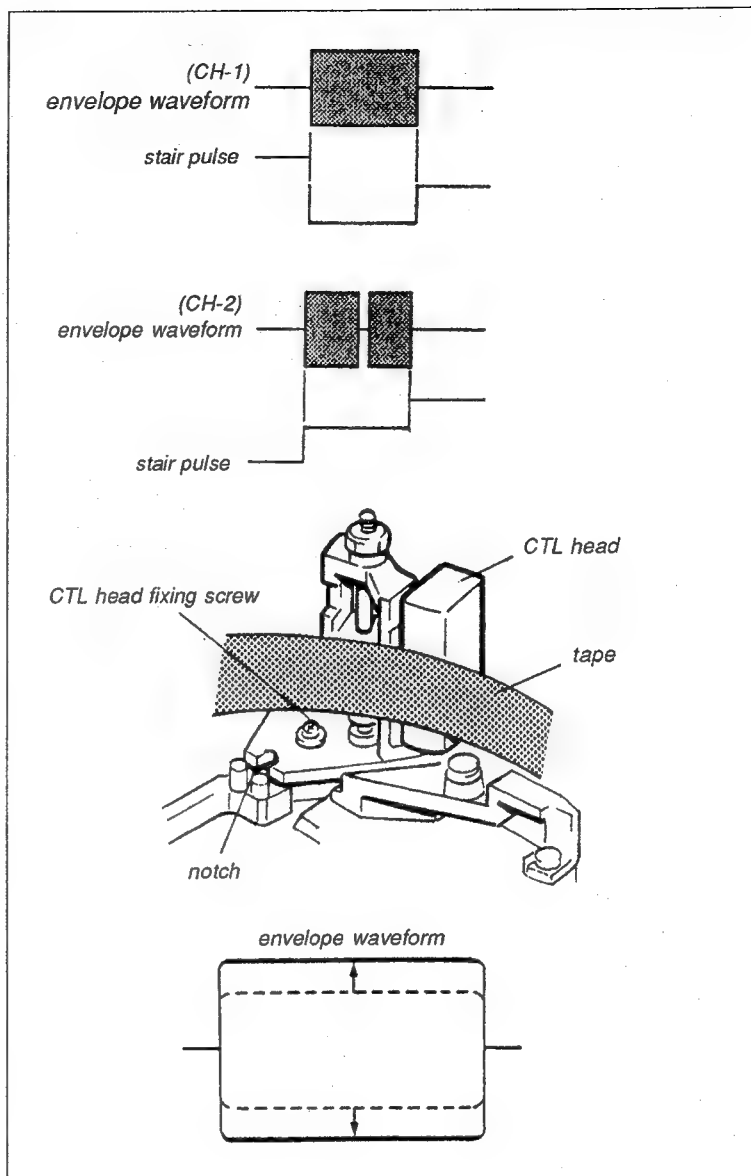
Mode: Play back the alignment tape.

Check procedure:

- Insert the alignment tape CR2-1BPS and put the unit into the PLAY mode.
- When pushed the (+) or (-) button of the tracking control on the servo remote control tool, confirm that the RF envelope waveform is decreased. (Perform the adjustment if the output waveform is increased.)
- Confirm that the relationship between the switching pulse and RF envelope waveform meets the required specification.

Adjustment procedure:

- Remove the servo remote control tool.
- Loosen the fixing screw of CTL head by 1/2 turn.
- Insert a flatblade 3mm screwdriver into the notch of the CTL Head Mounting Bracket and adjust the CTL head position so that the RF envelope waveform is maximum.
- Tighten the CTL head fixing screw.
- Check according to the check procedure.



6-11. AUDIO HEAD ZENITH ADJUSTMENT

Tool: Flatness plate

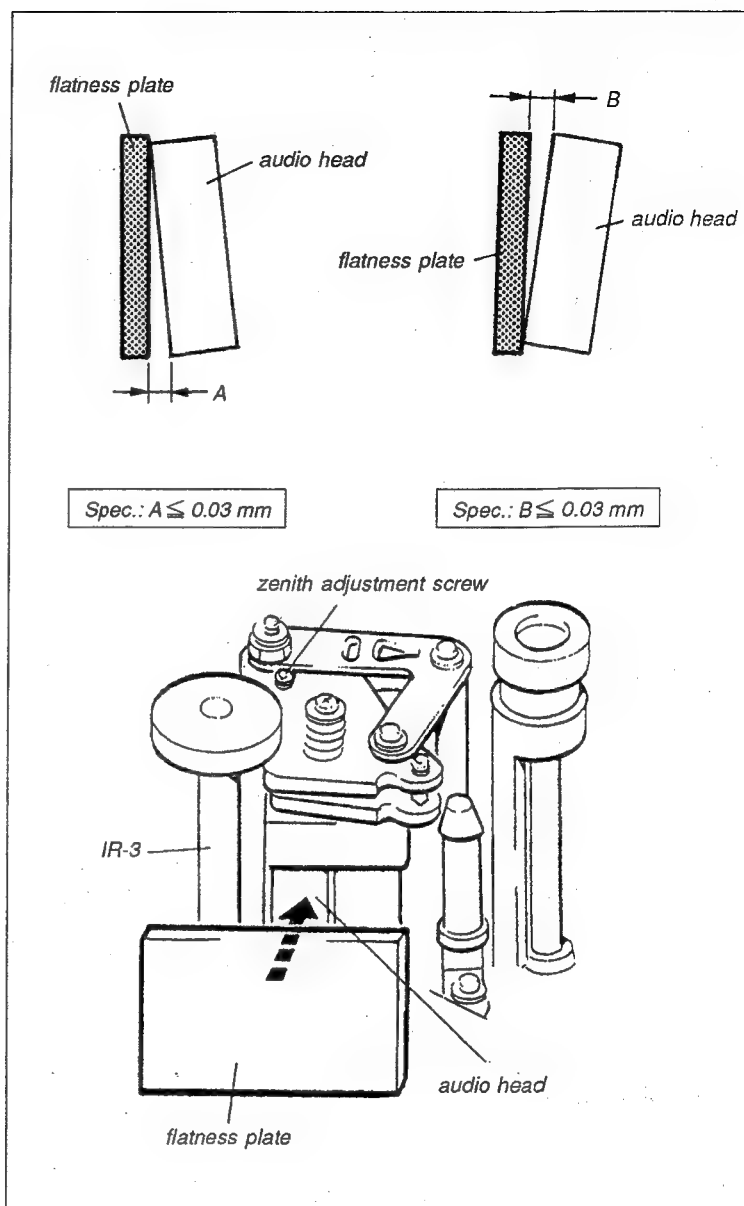
Mode: EJECT mode

Check procedure:

- (1) Put the flatness plate onto the IR-3 guide and audio head.
- (2) When the flatness plate is pressed onto the IR-3 guide, confirm that the clearance between the flatness plate and audio head meets the required specification.

Adjustment procedure:

- (1) Adjust the Zenith Adjustment Screw so that the specification is satisfied.
- (2) Adjust as follows:
 - Sec 6-14 Audio Head Phase Adjustment
 - Sec 6-12 TC Head Position Adjustment
 - Sec 6-13 Audio Head Height Adjustment
 - Sec 6-12 TC Head Position Adjustment



6-12. TC HEAD POSITION ADJUSTMENT

Tool: Alignment tape without a lid (CR2-1BPS)
Extension Board

Setting: (1) Extend the SV-97AP Board with an extension board.
(2) Connect the oscilloscope as follows:
CH-1: TP38 / Extension Board (CTL waveform)
CH-2: TP2 / TB-5 Board (TC waveform)
TRIG: TP20 / Extension Board (1/2 VD)

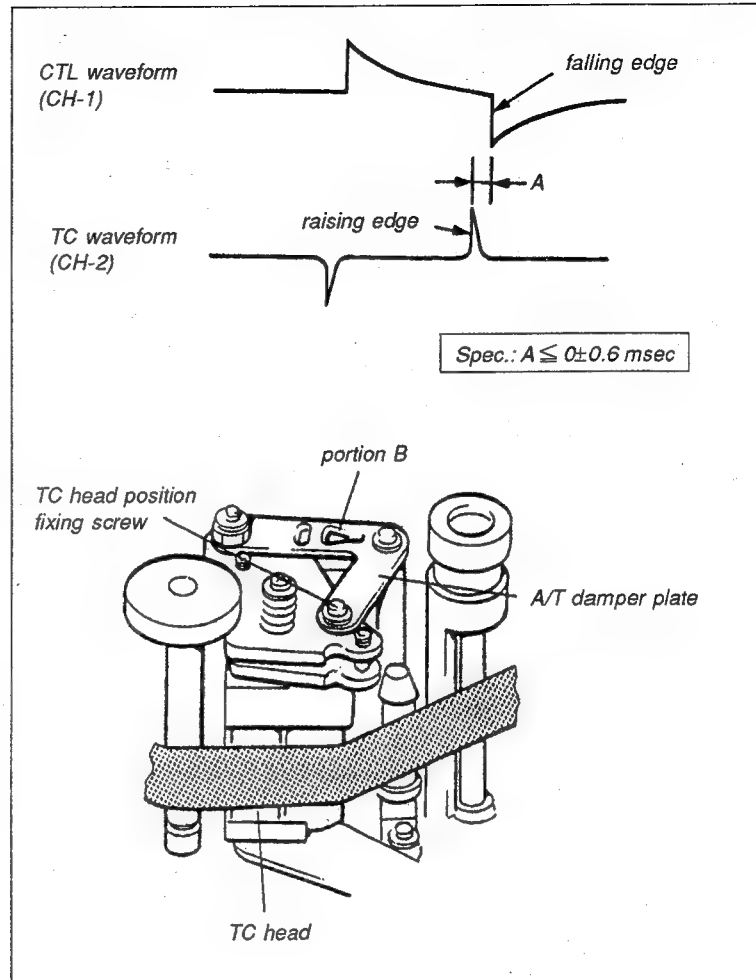
Mode: Play back the alignment tape.

Check procedure:

- (1) Insert the alignment tape CR2-1BPS and put the unit into the PLAY mode.
- (2) Confirm that the relationship between the phase at the falling edge of the CTL waveform and that at the raising edge of the TC waveform meets the required specification.

Adjustment procedure:

- (1) Loosen the TC Head Position Fixing Screw by one or two turns.
- (2) Insert a flatblade 3mm screwdriver into portion B of the A/T Damper Plate and adjust the TC head position so that the required specification is satisfied.
- (3) Tighten the TC Head Position Fixing Screw and recheck.



6-13. AUDIO HEAD HEIGHT ADJUSTMENT

Tool: Alignment tape without a lid (CR8-1APS)
Extension Board

Setting: (1) Extend the AU-97AP Board with an extension board
(2) Connect the oscilloscope as follows:
CH-1: TP105 / AU-97AP Board
CH-2: TP205 / AU-97AP Board

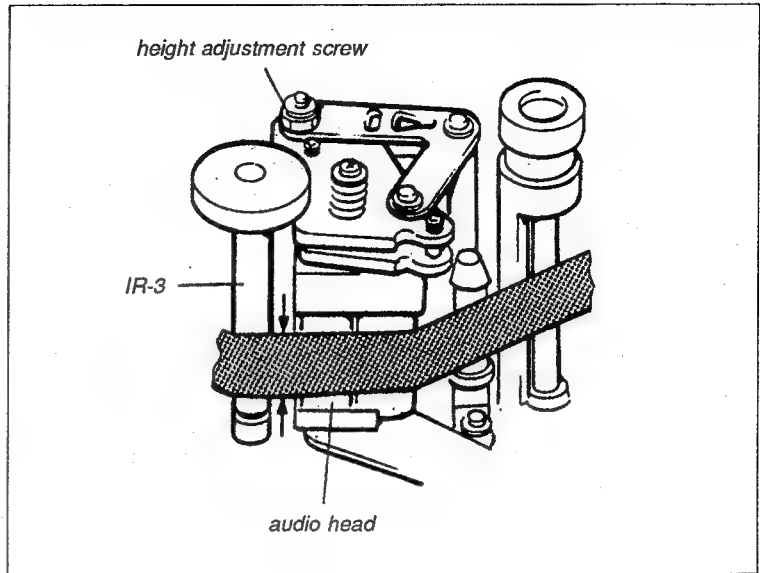
Mode: Play back the alignment tape.

Check procedure:

- (1) Play back a 1 kHz/0 dB audio signal on the alignment tape.
- (2) Pushing up and pressing down the tape of the illustrated portion between the audio head and IR-3 Guide. Confirm that the output waveform is decreased without increasing. (Perform the adjustment when the output waveform is increased.)

Adjustment procedure:

- When the output waveform is increased by pushing up the tape.
 - (1) Turn the Height Adjustment Screw clockwise so that the output waveform is maximum.
- When the output waveform is increased by pressing down the tape.
 - (2) Turn the Height Adjustment Screw counter-clockwise so that the output waveform is maximum.



6-14. AUDIO HEAD PHASE ADJUSTMENT

Tool: Alignment tape without a lid (CR8-1APS)
Extension Board

Setting:

- (1) Extend the AU-97AP Board with an extension board.
- (2) Connect the horizontal and vertical terminals of the oscilloscope to TP105 and TP205 on the AU-97AP Board.
- (3) Play back a 1 kHz audio signal on the alignment tape.
- (4) Adjust the oscilloscope for horizontal and vertical amplitudes to 6cm of a lissajous waveform.

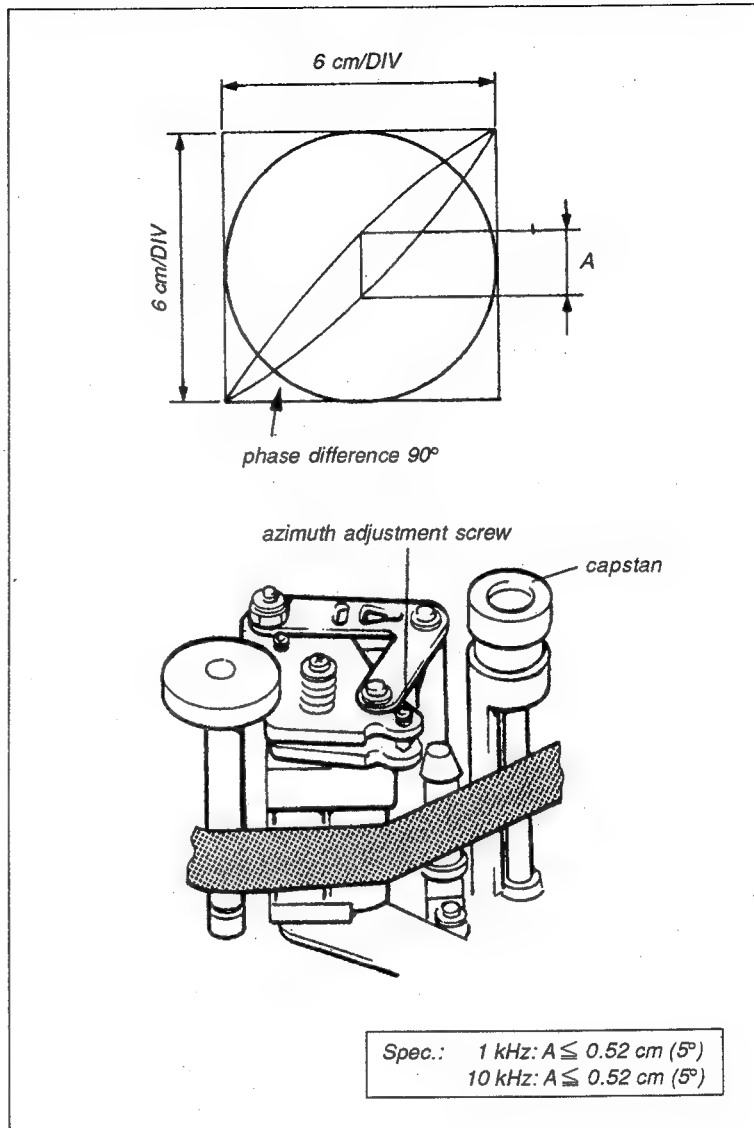
Mode: Play back the alignment tape.

Check procedure:

- (1) Play back a 1 kHz audio signal on the alignment tape.
- (2) Confirm that the phase difference meets the required specification.
- (3) Play back a 10 kHz/-10 dB audio signal on the alignment tape.
- (4) Confirm that the phase difference meets the required specification.

Adjustment procedure:

- (1) Play back 1 kHz and 10 kHz audio signals on the alignment tape.
- (2) Adjust the Azimuth Adjustment Screw so that both specifications are satisfied.



6-15. PB SWITCHING POSITION ADJUSTMENT

Tool: Alignment tape, CR2-1BPS
Two extension boards

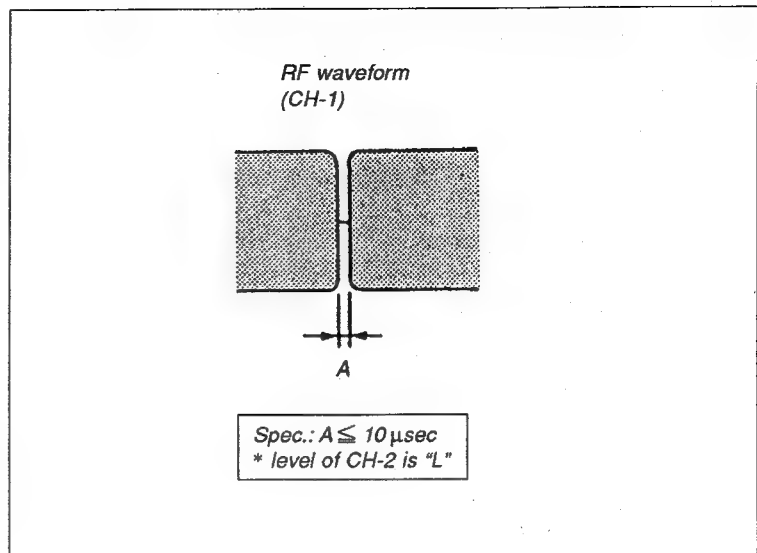
Setting:

- (1) Set the S1/VP-24P to the OFF position.
- (2) Extend the SV-97AP board with an extension board.
- (3) Extend the VP-24P board with an extension board.
- (4) Connect the oscilloscope as follows:
CH-1: TP33/Extension board (VP-24P)
CH-2: TP10/Extension board (SV-97AP)
TRIG: TP20/Extension board (SV-97AP)

Mode: Play back the alignment tape.

Adjustment procedure:

- (1) Adjust the RV4/SV-97AP so that the portion A of the CH-1 waveform is minimized during the level of CH-2 is "L".
- (2) Adjust the RV3/SV-97AP so that the specification is satisfied. If the level of CH-2 is "H", perform step (1) again.
- (3) After the adjustment is completed, set the S1/VP-24 to the ON position.



6-16. BRUSH ADJUSTMENT

6-16-1. Brush Position Adjustment

Mode: EJECT

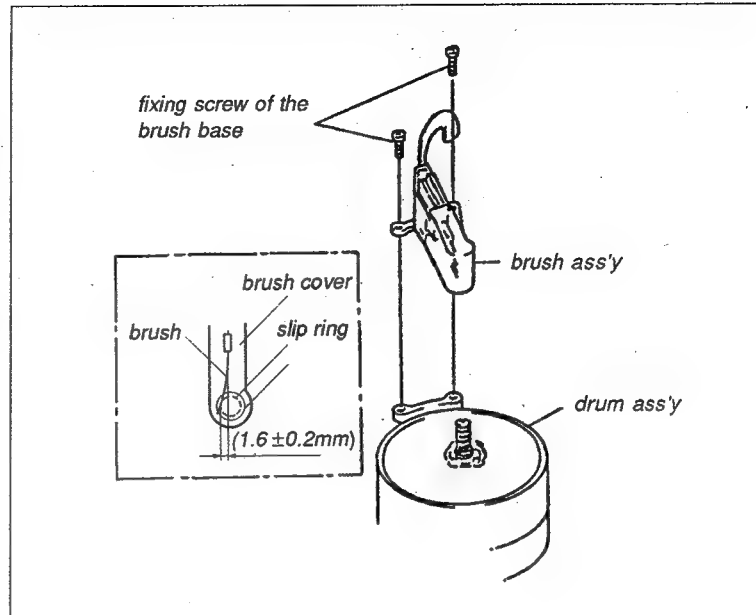
Check procedure:

Confirm that the slip ring and the brush are in the following status when viewed from top.

- (1) Make sure that the brush is positioned as shown in the illustration with reference to the slip ring.
- (2) Make sure that the slip ring is placed at the center of moldline on the brush cover.

Adjustment procedure:

- (1) Loosen the two fixing screws of the Brush Base, and adjust the position of the brush base so that the specification is satisfied.



6-16-2. Brush Height Adjustment

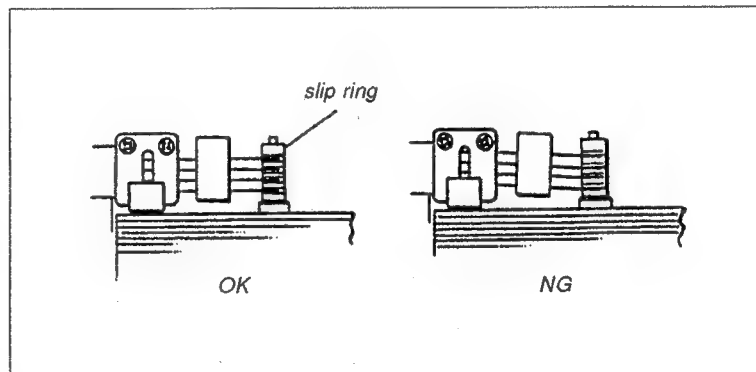
Mode: EJECT

Check procedure:

- (1) Confirm that the Brush is parallel to the Slip Ring Groove.

Adjustment procedure:

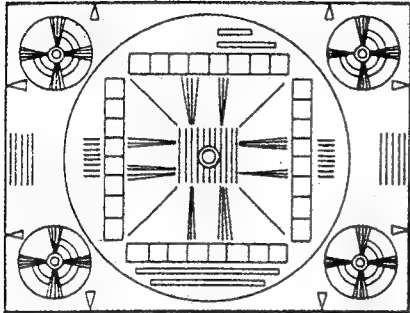
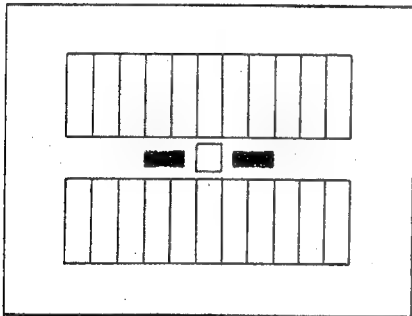
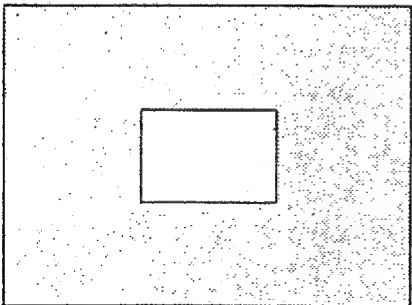
- (1) Remove the Brush Base from the unit as described in Sec. 6-16-1. Brush Position Adjustment.
- (2) Remove the Brush Cover from the Brush Base.
- (3) Install the Brush Base on the unit, and loosen the two fixing screws of the Brush Base and adjust so that the specification is satisfied.
- (4) After adjustment, install the Brush Cover and adjust the brush position as described in Sec. 6-16-1.

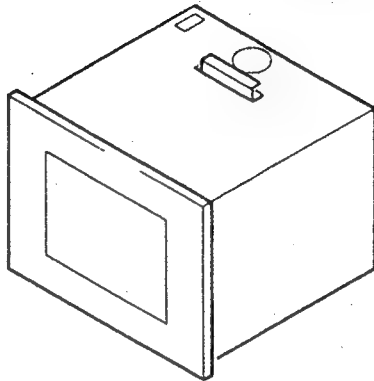
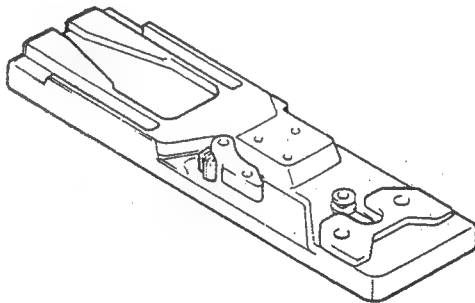
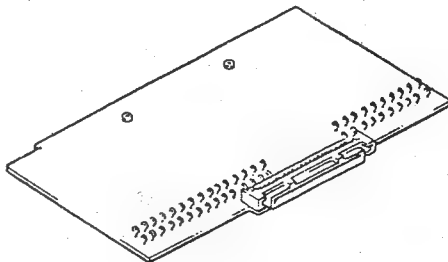


SECTION 7 CAMERA SYSTEM ALIGNMENT

7-1. PREPARATION

7-1-1. Tools and Measuring Instruments

J-6026-100-A	Resolution Chart
	
J-6026-130-B	Gray Scale Chart
<p>Stick the velvet (black) at the both sides of white pattern in the center so as to avoid the light leakage.</p> 	
White Window Chart	
<p>Make a hole in the center of black paper as shown in the figure.</p> 	

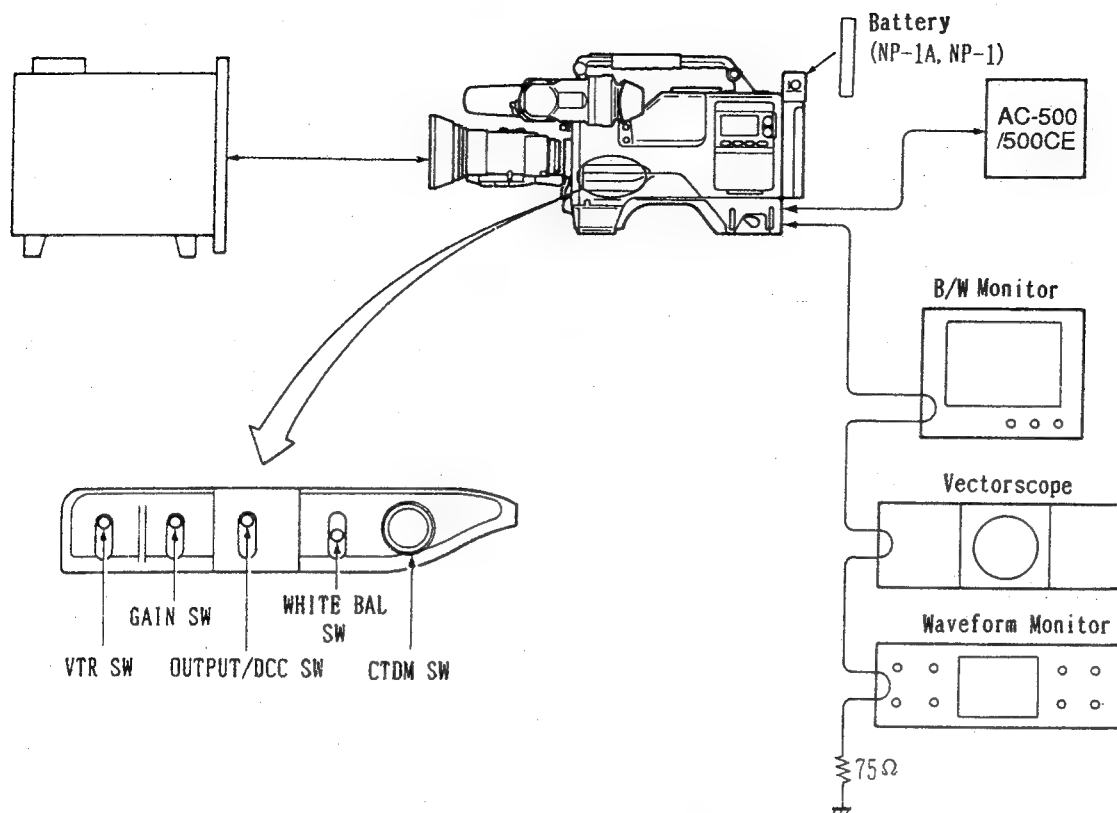
J-6029-140-B	Pattern Box PTB-500 (90 to 240Vac)
	
Standard Products	Tripod Adaptor
	
A-7520-314-A	Extension Board (EX-148)
	

- AC Adaptor (Sony AC-500/500CE) or Battery (NP-1A, NP-1)

【Measuring Instruments】

- Oscilloscope
- Waveform Monitor
- Vectorscope
- Frequency Counter
- Digital Voltmeter
- B/W Monitor (H. Resolution: more than 700 TV lines)
- Color Motor
- CF Pulse Generator

7-1-2. Connection and Initial Setting



- VBS signal output is available from VIDEO OUT 1 connector or VIDEO OUT 2 connector. When connected with the VA-500CE playback adaptor (option), VBS output is available from VIDEO OUT1 on the side panel.
- VBS signal output to the connector of playback adaptor, output signal from VIDEO OUT 2 on the rear panel and output signal from 26-pin connector on the BKW-402 are same signal. When connected with the playback adaptor and terminated by 75Ω, never terminate with 75Ω at VIDEO OUT 2 connector, it not correct level VBS signal cannot obtain.

1. Before adjustments, set the POWER switch to ON position, the VTR switch to the SAVE position and warm up for 10 minutes.
2. Reset the compensation data in the microcomputer. (Refer to Sec. 7-1-3.)
3. Set the switches and controls of the unit as follows.

[Side Panel]

POWER switch	: ON
VTR switch	: SAVE
GAIN switch	: 0
OUTPUT/DCC switch	: CAM/OFF
WHITE BAL switch	: PRST
FILTER selector	: 1 (3200K)
IRIS AUTO/MANU selector	: MANU
IRIS control	: CLOSE

4. Never touch the variable capacitor and resistor CV 1, 2, 3 and RV14 on the IE-30AP Board.

[IE-30AP Board]

S1 (DTL ON/OFF)	: OFF
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7-1-3. Precautions on Adjustments

- Boards Extension

When the boards are extended, be sure to turn the POWER switch to OFF position.

- Procedure of Resetting Compensation Data

Before 7-4-10. Black Set Pedestal Adjustment and 7-4-11. Flare Adjustment are carried out, the compensation data in the microcomputer must be reset in following order.

1. S2 (MEMORY RESET) / AT-49A board → RESET
2. The compensation data is reset and "MEMORY RESET" is displayed on the Viewfinder Monitor for 5 minutes.
3. S2 (MEMORY RESET) / AT-49A board → OPERATE

(NOTE) When the AUTO W/B BAL switch is not set to BLK or WHT, the compensation data remains cleared (initial condition).

When the S2 (MEMORY RESET) / AT-49A board is set to RESET, the compensation data is reset whenever to POWER switch is set to OFF. Set the S2 to RESET during adjustment.

- Partial Adjustment

Overall adjustment is described in Sec. 7-2. Camera Block Power Supply Alignment to Sec. 7-6. Auto System Adjustment. When performing part adjustment, refer to Sec. 7-8. Partial Adjustment.

- Earthing Point

Use the GND terminal (TP1, TP2) on the extension board, unless otherwise specified.

When the SY-117CP board is extended by the extension board, use the TP1 as GND terminal TP1 is colored with silver, and TP2 is gold.

7-2. CAMERA BLOCK POWER SUPPLY ADJUSTMENT

- The adjustment is not necessary if error is within $\pm 3\%$ of rated voltage.
- When performing this adjustment, be sure to readjust all of the following (to Sec. 7-7. Viewfinder System Adjustment).

7-2-1. +8.5V Adjustment and Each Voltage Check

- Setting

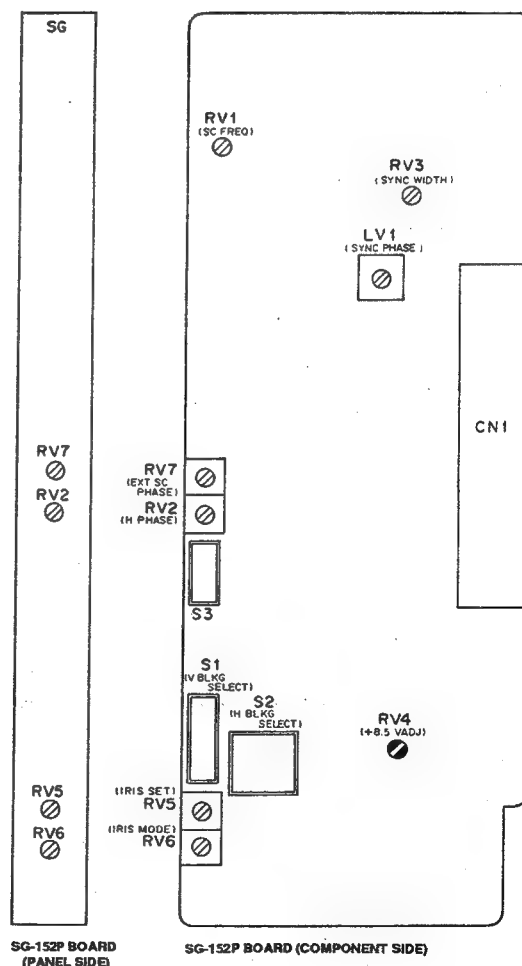
Equipment: Digital Voltmeter	Board: SG-152P board
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- Preparation

- To be extended; SG-152P board

- Adjustment procedures

- Test point : TP3(GND:TP1)/Extension board
• Adj. point : \odot RV4 (+8.5V ADJ)/SG-152P
• Spec. : $+8.5 \pm 0.1\text{Vdc}$
- Test point : TP47 (GND:TP1)/Extension board
• Spec. : $+4.6 \pm 0.1\text{Vdc}$
(Confirm)
- Test point : TP49 (GND:TP1)/Extension board
• Spec. : $-4.5 \pm 0.1\text{Vdc}$
(Confirm)
- Test point : TP5 (GND:TP1)/Extension board
• Spec. : $+4.7 \pm 0.1\text{Vdc}$
(Confirm)



7-3. SYNCHRONIZING SIGNAL SYSTEM ADJUSTMENT

- Before adjustment, set the POWER switch to ON position and warm up for 10 minutes.
- Make sure that the no signal is put into the TC LOCK VIDEO IN terminal.

7-3-1. Subcarrier Frequency Adjustment

• Setting

Equipment: Frequency Counter

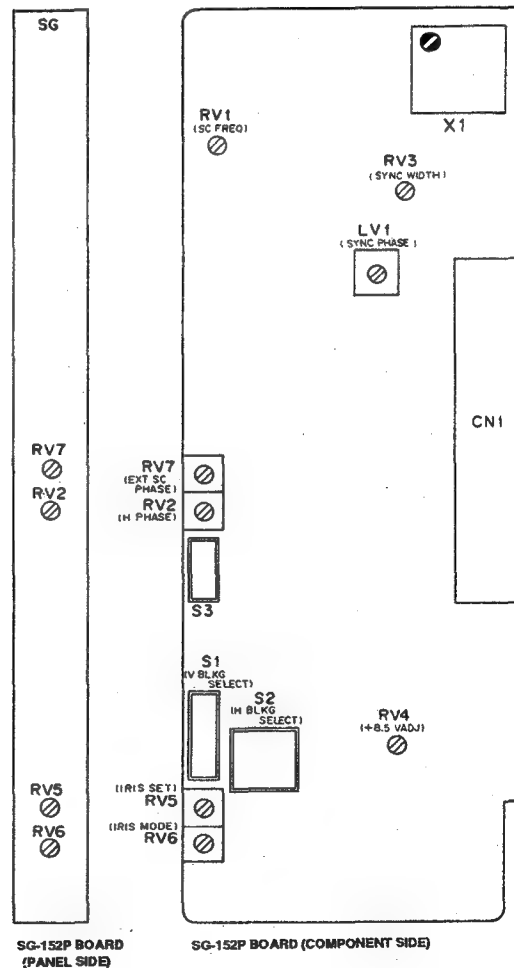
Board: SG-152P board

• Preparation

- To be extended; SG-152P board
- Connect the inductor more than 100 μ H in series to between the probe of Counter and Test Point.

• Adjustment procedures

- Test point : TP21 (GND: TP22)
/Extension board
- Adj. point : \odot X1 (SC FREQ)/SG-152P
- Spec. : 4,433,619 \pm 5MHz

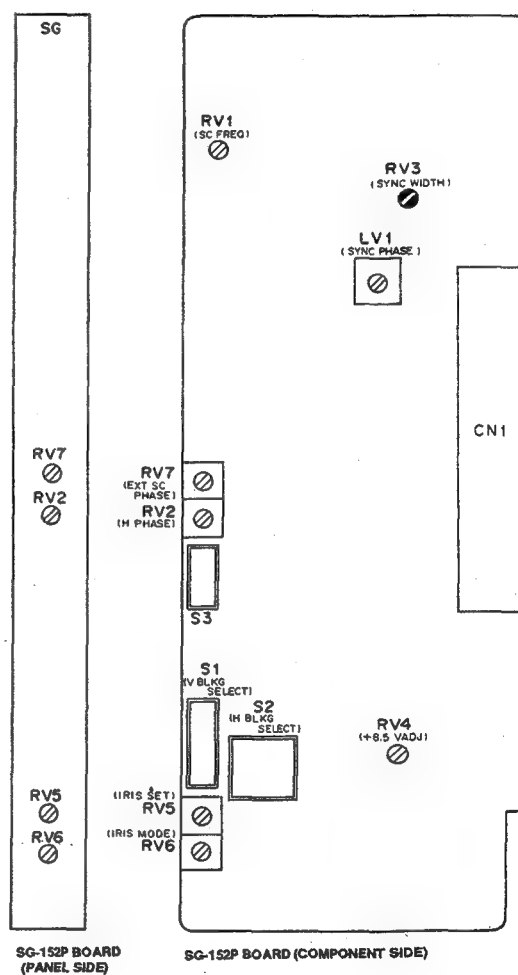
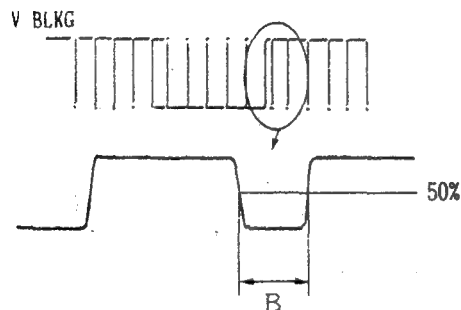
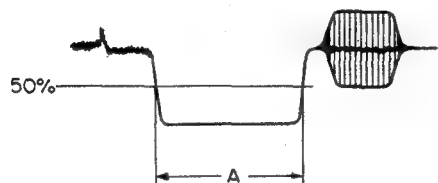


- Setting

Board: SG-152P board

- To be extended; SG-152P board
- S3 (Y/G SELECT) / EN-79P : ENC

- Test point : Waveform Monitor
- Adj. point : $\text{RV3}(\text{SYNC WIDTH})/\text{SG-152P}$
- Spec. : 1. SYNC width A = $4.7 \pm 0.1 \mu\text{s}$
 2. Confirm that the equalizing pulse width B is $2.3 \pm 0.1 \mu\text{s}$.



7-3-3. SYNC Phase Adjustment


- Setting

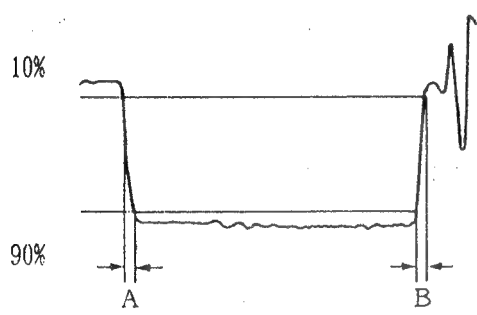
Equipment: Waveform Monitor	Board: SG-152P board
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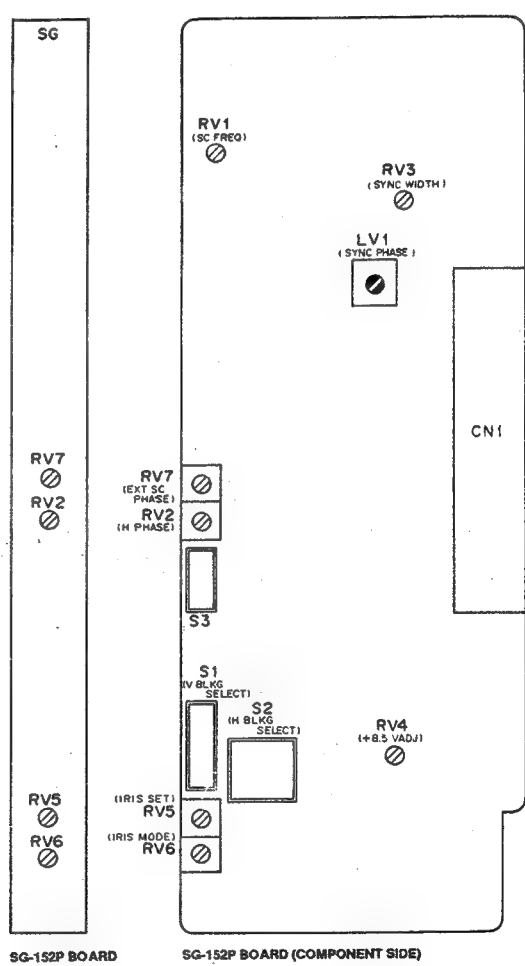
- Preparation

<ul style="list-style-type: none"> • To be extended; SG-152P board • Confirm that S3 (Y/G SELECT) / EN-79P is set to ENC.

- Adjustment procedures

- Test point : Waveform Monitor
- Adj. point :  LV1(SYNC PHASE)
- Spec. : A = B = $0.25 \pm 0.05\mu s$





7-3-4. Burst Flag Adjustment

• Setting

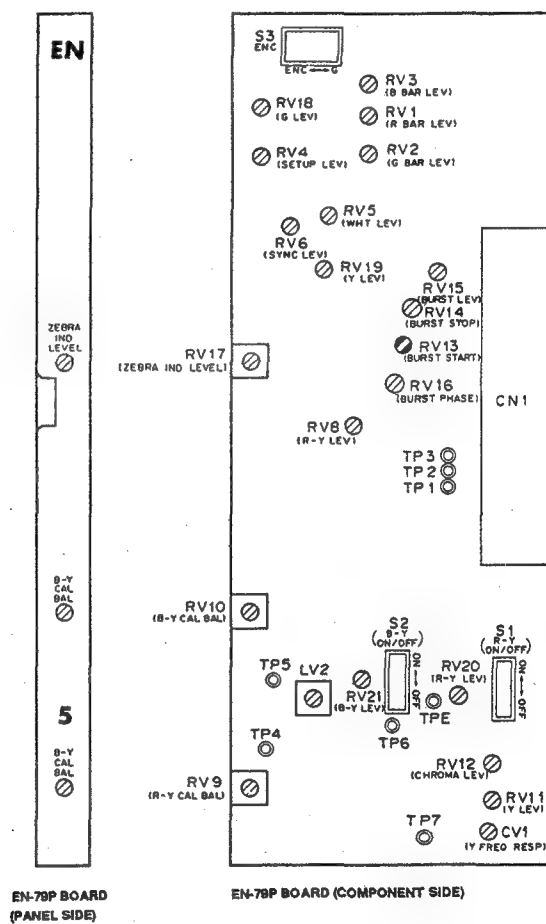
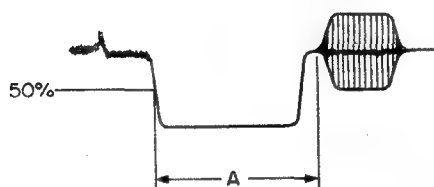
Equipment: Waveform Monitor	Board: EN-79P board
-----------------------------	---------------------

• Preparation

- To be extended; EN-79P board
- Confirm that S3 (Y/G SELECT) / EN-79P is set to ENC.

• Adjustment procedures

- Test point : Waveform Monitor
- Adj. point : ● RV13(BURST START)
/EN-79P
- Spec. : $A = 5.6 \pm 0.1\mu s$



7-3-5. H BLKG Adjustment

• Setting

Equipment: Waveform Monitor

Board: SG-152P board

• Preparation

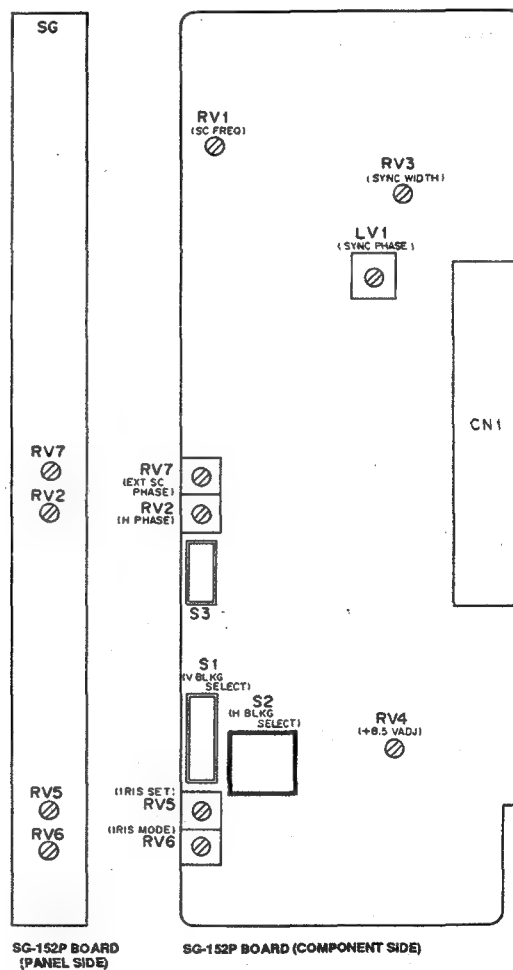
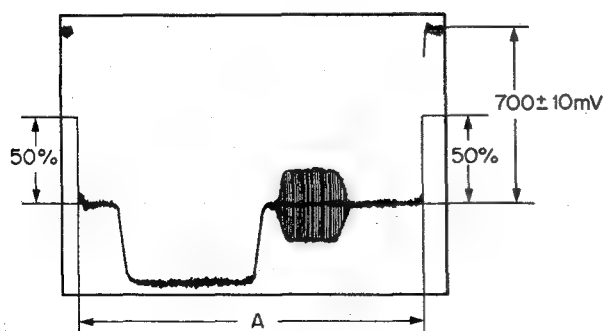
- To be extended; SG-152P board
- Confirm that S3 (Y/G SELECT) / EN-79P is set to ENC.
- AUTO/MANU switch Pattern Box : AUTO
- Set the zoom control to TELE and shoot the white area of the white window chart.

• Adjustment procedures

- Test point : VIDEO OUT TERMINAL
- Adj. point : IRIS CONTROL
- Spec. : $700 \pm 10 \text{ mV}$



- Test point : VIDEO OUT TERMINAL
- Adj. point : \odot S2 (H BLKG SELECT) / SG-152P
- Spec. : $A = 12.05 \pm 0.25 \mu\text{s}$



7-3-6. INT SC Phase Adjustment

• Note

- The procedure stated below applies to the adjustments where the Tektronix 1751 is used.
- If any other measuring instrument is used, observe the instructions given in the operation manual attached to it.

• Setting

Equipment: SC-H Phase Measuring instrument

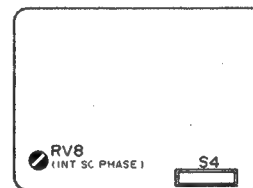
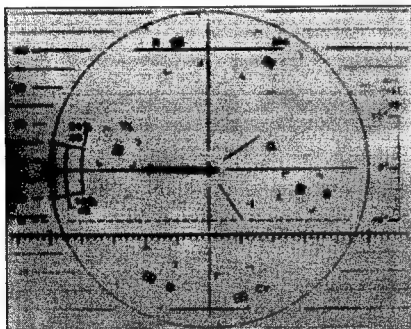
Board: SG-152P board

• Preparation

- Disconnect the vectorscope, and connect the Tektronix 1751 instead.
- Put the Tektronix 1751 into the SC-H mode.

• Adjustment procedures

- Test point : VIDEO OUT TERMINAL
- Adj. point : ⚙ RV8 (INC SC PHASE)/SG-157P
- Spec. : Position the luminous line of the burst (SC) and the luminescent spot of H properly.



SG-157P BOARD (SOLDERING SIDE)

7-4. VIDEO SIGNAL SYSTEM ADJUSTMENT
7-4-1. DC Balance Adjustment

BOARD CHANGE INFORMATION		
OLD NAME	→ NEW NAME	SERIAL NUMBER
VA-83	→ VA-168	44001 and higher

• Setting

Equipment: Dualtrace Oscilloscope	Board: VA-83/168 board
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• Preparation

- To be extended; VA-83 board
- ⦿RV1 (R GAIN), ⦿RV5 (G GAIN), ⦿RV9 (B GAIN) / VA-83 : mechanical center

• Adjustment procedures

• TRIG: HD (TP18/Extension board)

	Test point VA-83 board	Adj. point VA-83 board	Specification
G-ch	TP3 (GND : E1)	⦿RV16 (G DC BAL)	1.2 ± 0.1 Vdc
R-ch	TP1 (GND : E1)	⦿RV15 (R DC BAL)	1.2 ± 0.1 Vdc
B-ch	TP5 (GND : E1)	⦿RV17 (B DC BAL)	1.2 ± 0.1 Vdc

	Test point VA-168 board	Adj. point VA-168 board	Specification
G-ch	TP3 (GND : E1)	⦿RV16 (G DC BAL)	-1.9 ± 0.1 Vdc
R-ch	TP1 (GND : E1)	⦿RV15 (R DC BAL)	-1.9 ± 0.1 Vdc
B-ch	TP5 (GND : E1)	⦿RV17 (B DC BAL)	-1.9 ± 0.1 Vdc

The diagrams show the component layout for the VA-83 and VA-168 boards. The VA-83 board (top) has test points TP1, TP3, TP5, TP6, TP18, TP19, TP20, TP21, TP22 and adjustment points RV1, RV4, RV5, RV9, RV12, RV15, RV16, RV17, RV18, RV19, RV20, RV21, RV22. The VA-168 board (bottom) has test points TP1, TP3, TP5, TP6, TP18, TP19, TP20, TP21, TP22 and adjustment points RV1, RV4, RV5, RV9, RV12, RV15, RV16, RV17, RV18, RV19, RV20, RV21, RV22. The boards are shown from the panel side and the component side.

• Note

- After adjustment is completed, be sure to perform 7-4-1(a). R/B Black Offset Adjustment.

7-4-1(a). R/B Black Offset Adjustment

BOARD CHANGE INFORMATION

OLD NAME	NEW NAME	SERIAL NUMBER
VA-83	VA-168	44001 and higher

• Setting

Equipment: Oscilloscope	Board: VA-83/168 board
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• Preparation

• Lens iris	→	Close "C"
• OUTPUT/DCC Switch (side panel)	→	"CAM/OFF"
• S2 <u>TEST</u> /VA-83 board	→	"OFF"

• Adjustment procedures

• TRIG: HD (TP18/Extension board)
Adjust every channel as shown below.

	Test point/VA-83 board	Adj. point/VA-83 board
R-ch	TP2	RV21
B-ch	TP6	RV22

↓

VA-83 BOARD (PANEL SIDE)

VA-83 BOARD (COMPONENT SIDE)

VA-168 BOARD (PANEL SIDE)

VA-168 BOARD (COMPONENT SIDE)

• Note

• After adjustment is completed, be sure to perform 7-4-2. VA Gain Adjustment.
--

7-4-2. VA Gain Adjustment

BOARD CHANGE INFORMATION

OLD NAME	→	NEW NAME	SERIAL NUMBER
VA-83	→	VA-168	44001 and higher

• Note

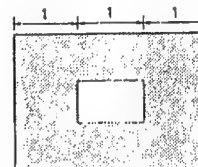
- This adjustment should be performed after 7-4-1. DC Balance Adjustment is completed.
- Use a white pattern chart for this adjustment.
Adjust the lighting so that the white area is exactly 3200K of color temperature.
- When the pattern box is used, well maintained pattern box should be used.

• Setting

Equipment: Dualtrace Oscilloscope	Board: VA-83/168 board
-----------------------------------	------------------------

• Preparation

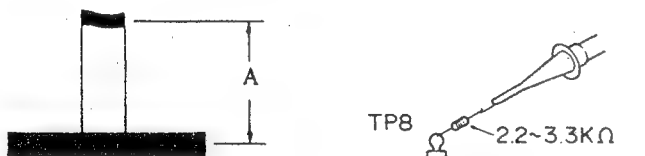
- To be extended; VA-83 board
- Adjust the iris control and shoot the chart as shown right.
- Gain Selector: 0



Monitor Screen

• Adjustment procedures

1. • Test point : TP8 (GND:TP9)
/Extension board
- Adj. point : When the lens diaphragm is set at F8, the signal level must be within the specifications.
- Spec. : VA-83 board ; $A = 0.130 \pm 0.02V_{p-p}$
VA-168 board ; $A = 0.275 \pm 0.03V_{p-p}$



- When measuring the TP8, connect the resistance (2.2~3.3 kΩ) between the probe and the TP8 connector.

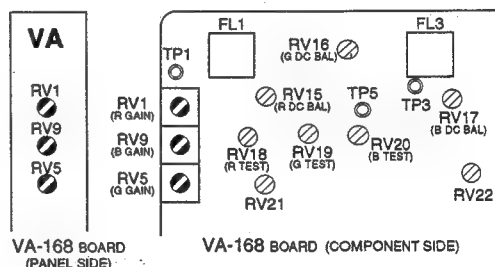
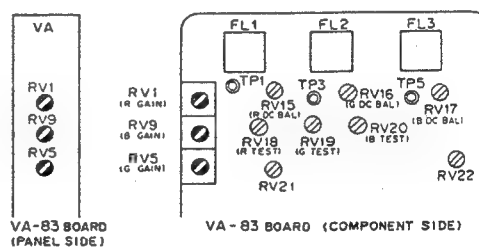
2. • Test point : G Gain : TP39/Extension board
R Gain : TP41/Extension board
B Gain : TP43/Extension board

- Adj. point : RV5 (G GAIN)/VA-83
RV1 (R GAIN)/VA-83
RV9 (B GAIN)/VA-83

- Spec. : $A = 0.50 \pm 0.01V$



TRIG: HD (TP18/Extension board)



• Note

- After adjustment is completed, check that the values of 7-4-1 DC Balance Adjustment are not changed.
When the values are changed make this adjustment after readjusting the VA Gain.

7-4-3. Test Signal Waveform Adjustment

BOARD CHANGE INFORMATION

OLD NAME	→	NEW NAME	SERIAL NUMBER
VA-83	→	VA-168	44001 and higher

• Note

- This adjustment should be performed after 7-4-2. VA Gain Adjustment is completed.

• Setting

Equipment: Dualtrace Oscilloscope

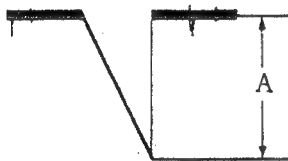
Board: VA-83/168 board

• Preparation

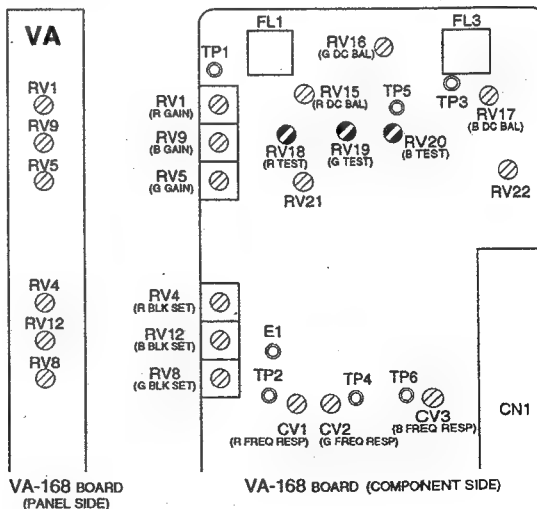
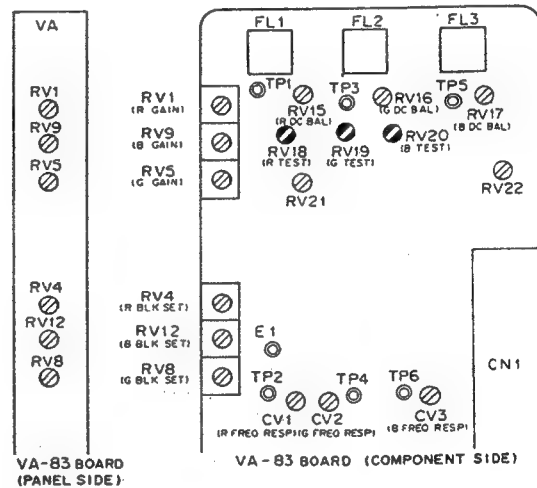
- To be extended; VA-83 board
- S3 (TEST SAW) / SG-152P : ON

• Adjustment procedures

- Test point : G TEST
TP39/Extension board
R TEST
TP41/Extension board
B TEST
TP43/Extension board
- Adj. point : ● RV19 (G TEST)/VA-83
● RV18 (R TEST)/VA-83
● RV20 (B TEST)/VA-83
- Spec. : A = $0.50 \pm 0.01V$



TRIG: HD (TP18/Extension board)



• Note

- After adjustment is completed, set the S3 to OFF.

7-4-4. Pre Knee Adjustment

BOARD CHANGE INFORMATION

OLD NAME	→	NEW NAME	SERIAL NUMBER
VA-83	→	VA-168	44001 and higher

• Setting

Equipment: Dualtrace Oscilloscope

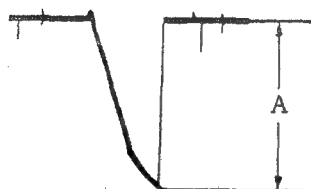
Board: VA-83/168 board

• Preparation

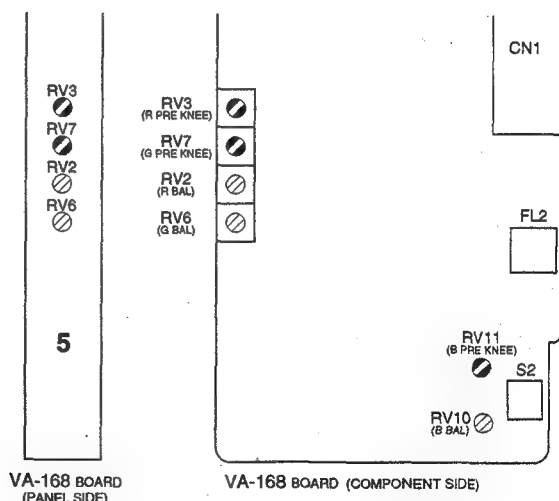
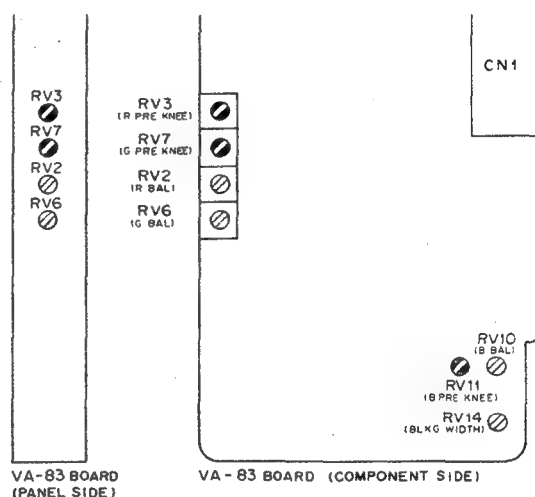
- To be extended; VA-83 board
- Confirm that S1(GAIN SELECT) / VA-104 is set to +18dB.
- S3 (TEST SAW) / SG-152P: ON
- GAIN selector: 18

• Adjustment procedures

- Test point : G PRE KNEE
TP39/Extension board
R PRE KNEE
TP41/Extension board
B PRE KNEE
TP43/Extension board
- Adj. point : ● RV7 (G PRE KNEE)/VA-83
● RV3 (R PRE KNEE)/VA-83
● RV11 (B PRE KNEE)/VA-83
- Spec. : $A = 1.65 \pm 0.02V$



TRIG: HD (TP18/Extension board)



• Note

- After adjustment is completed, set the S3 to OFF, GAIN selector to 0.

7-4-5. Modulator Balance Adjustment

BOARD CHANGE INFORMATION

OLD NAME	NEW NAME	SERIAL NUMBER
VA-83	VA-168	44001 and higher

• Setting

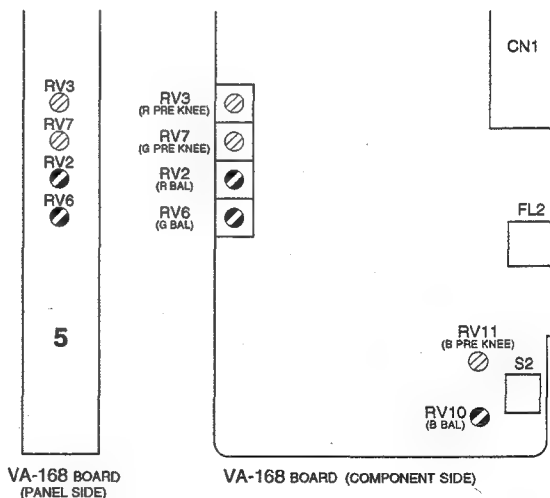
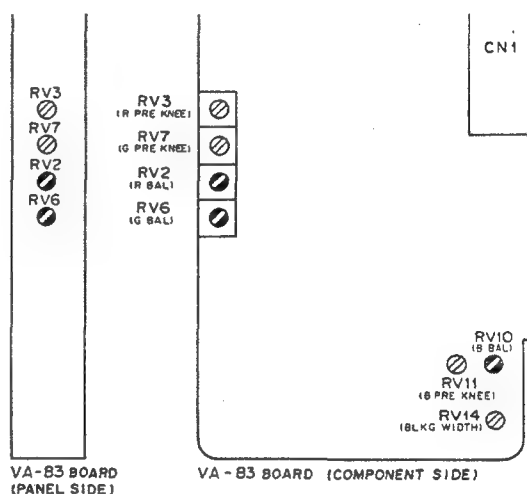
Equipment: Dualtrace Oscilloscope	Board: VA-83/168 board
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• Preparation

- To be extended; VA-83 board
- Set the iris control to CLOSE.

• Adjustment procedures

- Test point : G Balance
TP39/Extension board
R Balance
TP41/Extension board
B Balance
TP43/Extension board
- Adj. point :
 - RV6 (G BAL)/VA-83
 - RV17(G-V MOD SAW)/VA-83, IC15
 - RV2 (R BAL)/VA-83
 - RV16(R-V MOD SAW)/VA-83, IC15
 - RV10 (B BAL)/VA-83
 - RV18(B-V MOD SAW)/VA-83, IC15
- Spec. : Adjust the volumes so that the waveform does not change even if the volume is turned both clockwise and counter-clockwise.



TRIG: HD (TP17/Extension board)

RV1	RV13	RV4	RV16	RV10	RV7	RV22	RV19
RV3	RV15	RV6	RV18	RV12	RV9	RV24	RV21
RV2	RV14	RV5	RV17	RV11	RV8	RV23	RV20

H1C (IC15)
(COMPONENT SIDE) - On the VA-83 Board-

• Note

- After adjustment is completed, be sure to perform 7-4-9. White Shading Adjustment.

7-4-6. PR Pre Gain Adjustment

• Note

• This adjustment should be performed after 7-4-3. Test Signal Waveform Adjustment is completed.

• Setting

Equipment: Dualtrace Oscilloscope

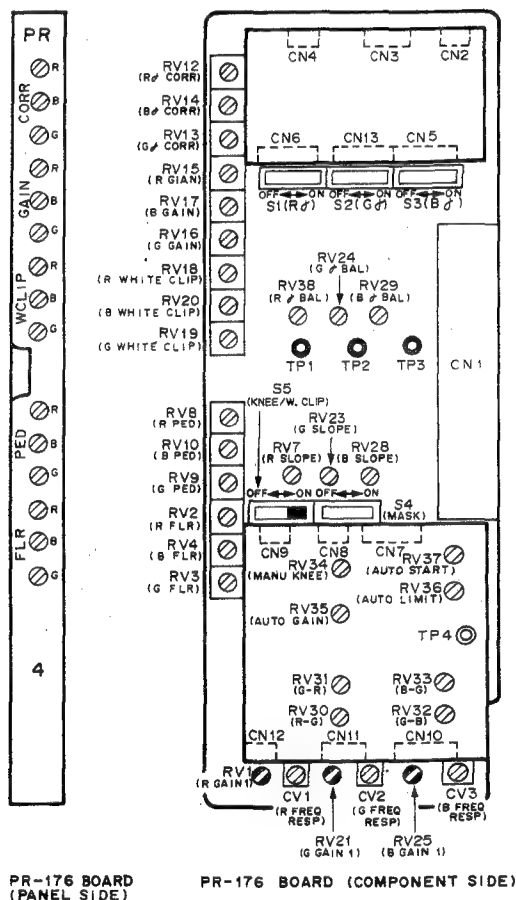
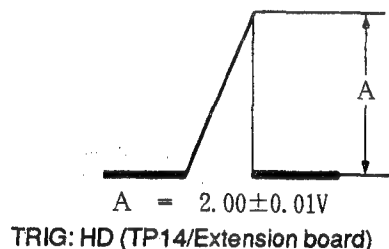
Board: PR-176 board

• Preparation

- To be extended; PR-176 board
- S3 (TEST SAW)/SG-152P: ON
- S5 (WHITE CLIP & KNEE ON/OFF)/PR-176: OFF

• Adjustment procedures

- Test point : G Pre Gain
TP2/PR-176 board
R Pre Gain
TP1/PR-176 board
B Pre Gain
TP3/PR-176 board
- Adj. point : RV21 (G GAIN 1)/PR-176
RV1 (R GAIN 1)/PR-176
RV25 (B GAIN 1)/PR-176
- Spec. :



• Note

- After adjustment is completed, set the switches as follows: Switches on the PR-176 board
 - S1 (R γ): ON
 - S2 (G γ): ON
 - S3 (B γ): ON
 - S5 (WHITE CLIP & KNEE ON/OFF): ON
- Switch on the SG-152P board
 - S3 (TEST SAW): OFF

7-4-7. Carrier Balance Adjustment

• Setting

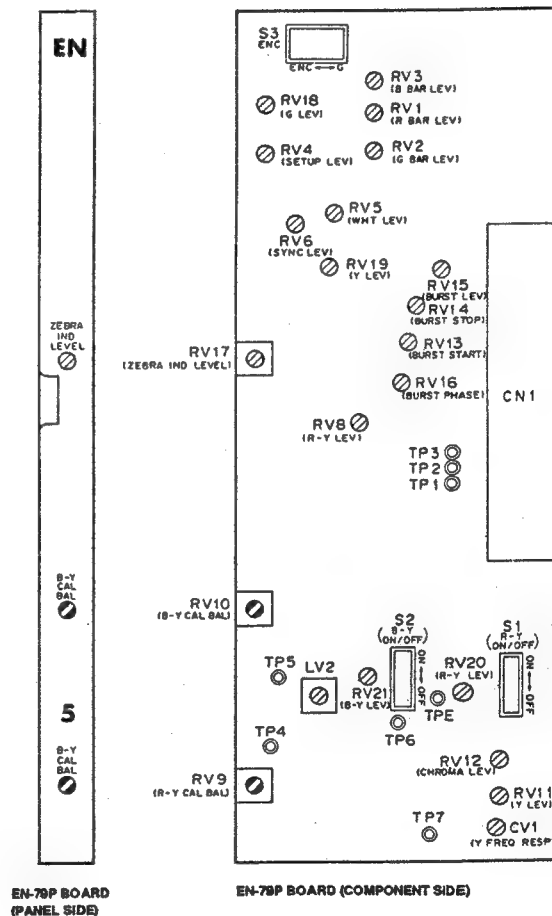
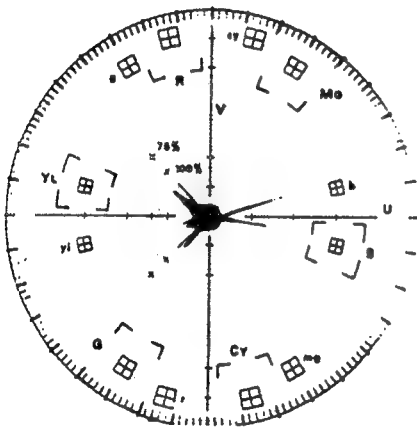
Equipment: Vectorscope	Board: EN-79P board
------------------------	---------------------

• Preparation

• OUTPUT/DCC SW (side panel): BARS/OFF
--

• Adjustment procedures

- Test point : VIDEO OUT Terminal
- Adj. point :
 - RV9 (R-Y CAL BAL)/EN-79P
 - RV10 (B-Y CAL BAL)/EN-79P
- Spec. : Turn RVs so that the black luminescent spot is in the center of the vectorscope.



• Note

- When a black luminescent spot cannot be discriminated because of two or more luminescent spots, turn RV1 (R BAR LEV) on the EN-79P board. The black luminescent spot will not move. After RV1 is turned, make the 7-4-17 Color Bar Adjustment.

7-4-8. Black Shading Adjustment

BOARD CHANGE INFORMATION

OLD NAME	→	NEW NAME	SERIAL NUMBER
VA-83	→	VA-168	44001 and higher

• Setting

Equipment: Dualtrace Oscilloscope

Board: VA-83/168 board

• Preparation

- To be extended; VA-83 board
- Set the iris control to CLOSE.
- GAIN selector (side panel): 18

• Adjustment procedures

- Test point : TP39/Extension board (G)
TP41/Extension board (R)
TP43/Extension board (B)

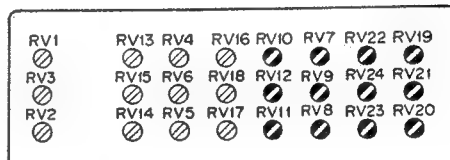
- Adj. point : (G)

H SAW : ● RV8/VA-83 (IC15)
V SAW : ● RV20/VA-83 (IC15)
H PARA : ● RV11/VA-83 (IC15)
V PARA : ● RV23/VA-83 (IC15)

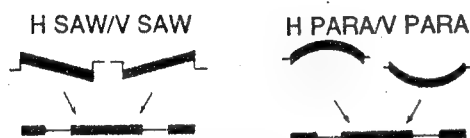
(R)
H SAW : ● RV7/VA-83 (IC15)
V SAW : ● RV19/VA-83 (IC15)
H PARA : ● RV10/VA-83 (IC15)
V PARA : ● RV22/VA-83 (IC15)

(B)
H SAW : ● RV9/VA-83 (IC15)
V SAW : ● RV21/VA-83 (IC15)
H PARA : ● RV12/VA-83 (IC15)
V PARA : ● RV24/VA-83 (IC15)

- Spec. :



HIC (IC15)
(COMPONENT SIDE) -On the VA-83 Board-



H TRIG: HD (TP18/Extension board)
V TRIG: VD (TP17/Extension board)

1. When a 10k-ohm resistor is connected to the probe, the waveform can be easily observed on the oscilloscope.
2. When the black shading occurs, adjust the RVs so that the waveform is flat.

• Note

- After adjustment is completed, set the GAIN selector (side panel) to 0.

7-4-9. White Shading Adjustment

BOARD CHANGE INFORMATION

OLD NAME	→	NEW NAME	SERIAL NUMBER
VA-83	→	VA-168	44001 and higher

• Note

- This adjustment should be performed after the 7-4-5 Modulator Balance Adjustment is completed.

• Setting

Equipment: Dualtrace Oscilloscope

Board: VA-83/168 board

• Preparation

- To be extended; VA-83 board
- S5 (WHITE CLIP & KNEE ON/OFF) / PR-176: OFF
- Set the zoom control to TELE and shoot the white area of the white window chart.

• Adjustment procedures

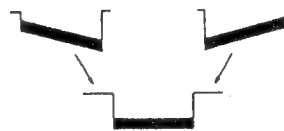
1. • Test point : VIDEO OUT Terminal

- Adj. point : IRIS control
- Spec. : $700 \pm 10 \text{ mV}$



RV1	RV13	RV4	RV16	RV10	RV7	RV22	RV19
RV3	RV15	RV6	RV18	RV12	RV9	RV24	RV21
RV2	RV14	RV5	RV17	RV11	RV8	RV23	RV20

H1C (IC15)
(COMPONENT SIDE) -On the VA-83 Board-



2. • Test point : TP39/Extension board (G)

TP41/Extension board (R)

TP43/Extension board (B)

• Adj. point : (G)

H MOD SAW : ● RV5/VA-83 (IC15)

V MOD SAW : ● RV17/VA-83 (IC15)

V EXT SAW : ● RV14/VA-83 (IC15)

: (R)

H MOD SAW : ● RV4/VA-83 (IC15)

V MOD SAW : ● RV16/VA-83 (IC15)

V EXT SAW : ● RV13/VA-83 (IC15)

: (B)

H MOD SAW : ● RV6/VA-83 (IC15)

V MOD SAW : ● RV18/VA-83 (IC15)

V EXT SAW : ● RV15/VA-83 (IC15)

- Spec. : When the white shading occurs, adjust the RVs so that the waveform is flat.

(NOTE):

The V EXT SAW Adjustment is performed when the lens with an extender is used. Before adjustment, set the lense's EXT lever to the X2 position and adjust the iris control so that the output level at the VIDEO OUT terminal is $700 \pm 10 \text{ mV}$. After adjustment is completed set the EXT level to the X1 position.

• Note

- After adjustment is completed, set S5 (WHITE CLIP & KEEP ON/OFF) on the PR-176 board to ON.

7-4-10. Black Set-Pedestal Adjustment

Step 1.

• NOTE

- This adjustment should be performed after the correction data of the microcomputer is erased.

• Setting

Equipment: Waveform Monitor

Board: VA-83/168 board

• Preparation

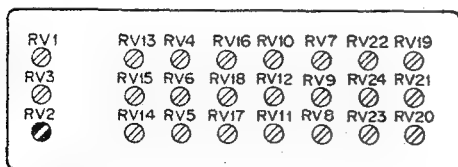
- To be extended; VA-83 board
- Set the IRIS control to CLOSE.
- S3 (Y/G SELECT)/EN-79P: G
- Adjust the PEDESTAL control (on side panel) so that the pedestal level is approximately 70 mV.

• Adjustment procedures

- Test point : Waveform Monitor (LUM mode)
- Adj. point :
 - RV8 (G BLK SET)/VA-83
 - RV2 (G +18dB BLK SET)/VA-83, IC15
- Spec. : 1. Adjust so that the pedestal level does not fluctuate when the gain switch is set from 0 to 9 and vice versa.



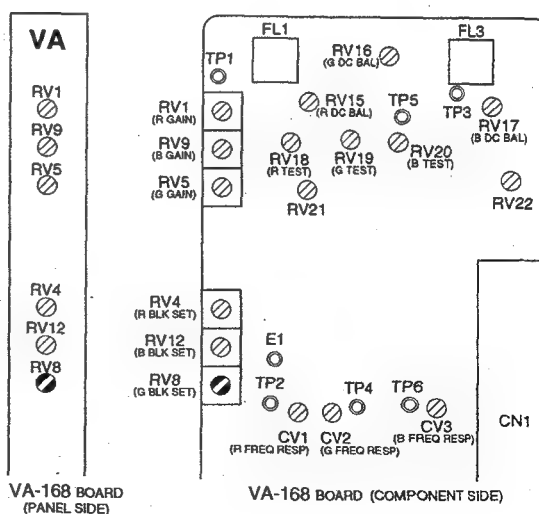
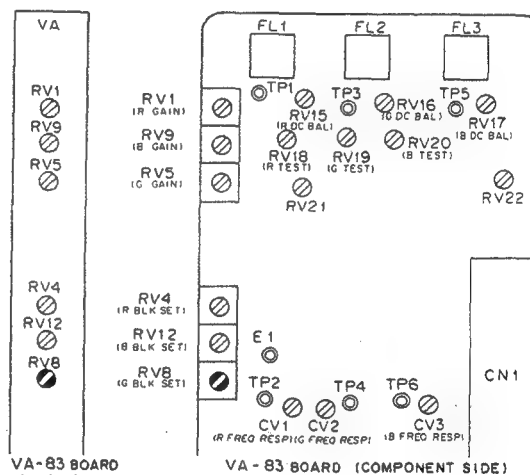
2. Adjust so that the pedestal level does not fluctuate when the gain switch is set from 0 to 18 and vice versa.



HIC (IC15)
(COMPONENT SIDE) -On the VA-83 Board-

BOARD CHANGE INFORMATION

OLD NAME	→	NEW NAME	SERIAL NUMBER
VA-83	→	VA-168	44001 and higher



Step 2.

• Setting

Equipment: Dualscope Oscilloscope (DC mode)

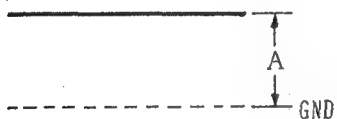
Board: PR-176 board

• Preparation

- To be extended; PR-176 board

• Adjustment procedures

- Test point : TP39/Extension board
- Adj. point : PEDESTAL control
(side panel)
- Spec. : $A = +2.3 \pm 0.1 \text{ Vdc}$



Step 3.

• Setting

Equipment: Waveform Monitor

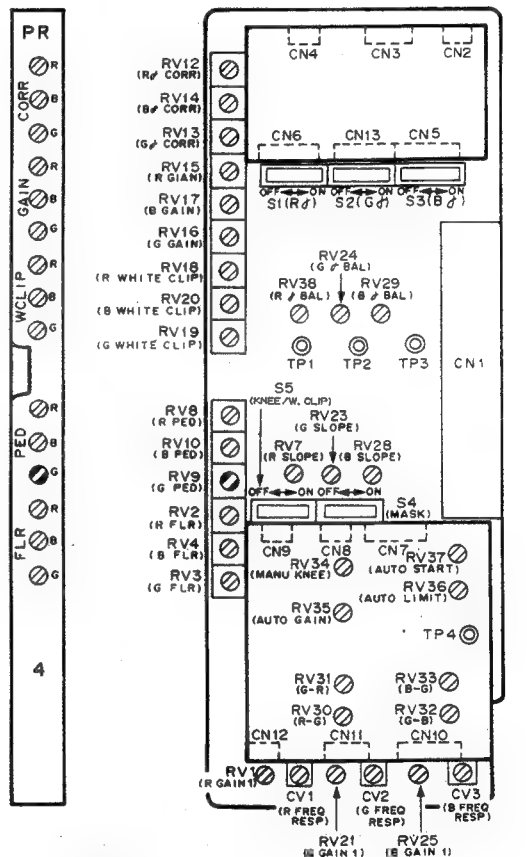
Board: PR-176 board

• Preparation

• GAIN selector (side panel): 0

• Adjustment procedures

- Test point : Waveform Monitor (LUM mode)
- Adj. point : ● RV9 (G PED)/PR-176
- Spec. : A = 20mV



PR-176 BOARD
(PANEL SIDE)

PR-176 BOARD (COMPONENT SIDE)

Step 4
• Setting

Equipment: Vectorscope

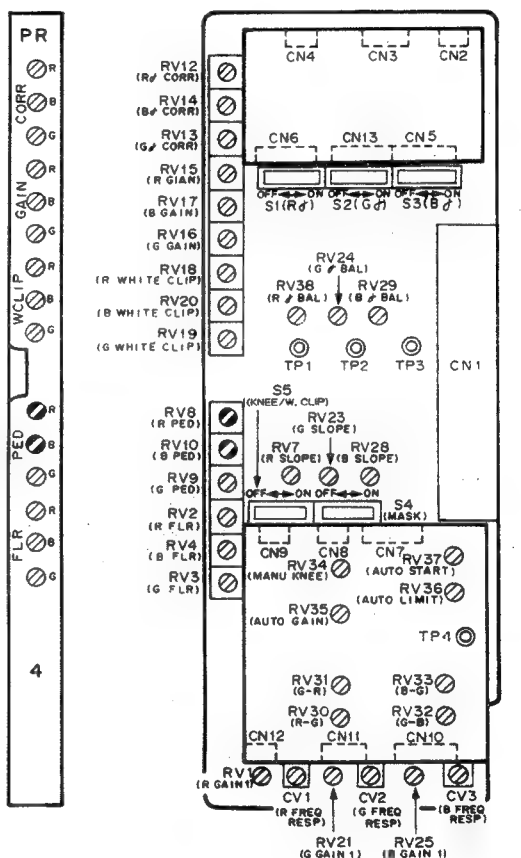
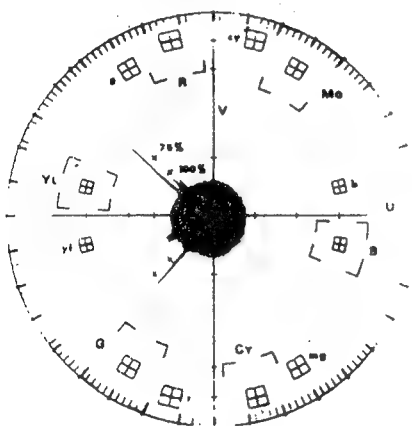
Board: PR-176 board

• Preparation

• S3 (Y/G SELECT)/EN-79P: ENC

• Adjustment procedures

- Test point : Vectorscope
- Adj. point : ●RV8 (R PED)/PR-176
●RV10 (B PED)/PR-176
- Spec. : Adjust so that the luminescent spot is in the center.



PR-176 BOARD
(PANEL SIDE)

PR-176 BOARD (COMPONENT SIDE)

- Setting



OLD NAME	→	NEW NAME	SERIAL NUMBER
VA-83	→	VA-168	44001 and higher

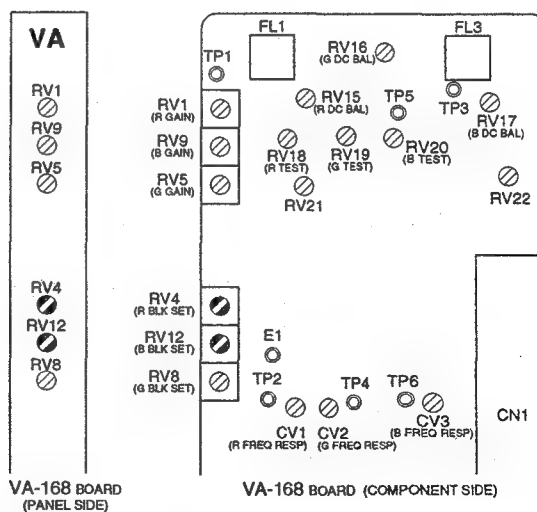
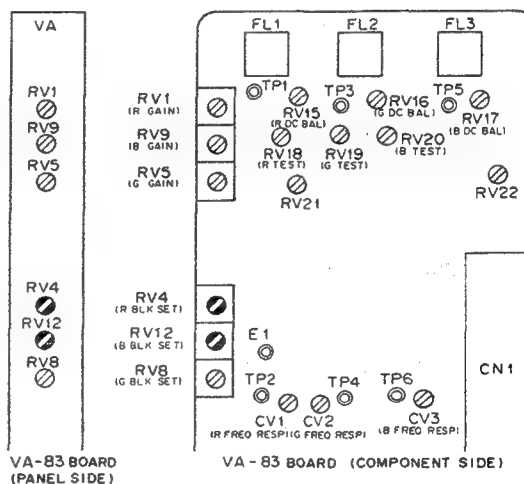
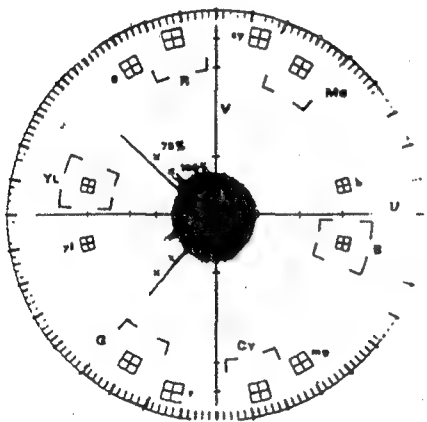
Board: VA-83/168 board

- Preparation

- To be extended: VA-83 board
- GAIN selector (side panel): 9

- Adjustment procedures

- Test point : Vectorscope
- Adj. point :  RV4 (R BLK SET)/VA-83
 RV12 (B BLK SET)/VA-83
- Spec. : Adjust so that the luminescent spot is in the center.



- Step 6
• Setting

BOARD CHANGE INFORMATION

OLD NAME	→	NEW NAME	SERIAL NUMBER
VA-83	→	VA-168	44001 and higher

Equipment: Vectorscope

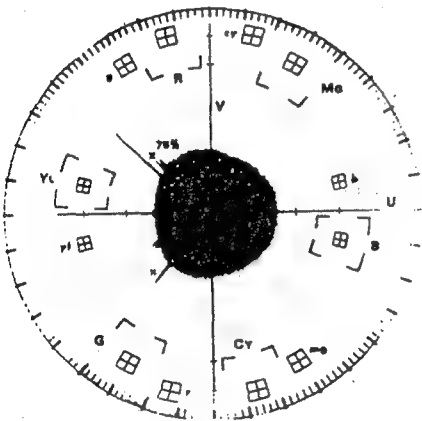
Board: VA-83/168 board

• Preparation

- GAIN selector (side panel): 18

• Adjustment procedures

- Test point : Vectorscope
- Adj. point : ☒RV1 (R + 18dB BLK SET)/VA-83, IC15
☒RV3 (R + 18dB BLK SET)/VA-83, IC15
- Spec. : Adjust so that the luminescent spot is in the center.



RV1	RV13	RV4	RV16	RV10	RV7	RV22	RV19
<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
RV3	RV15	RV6	RV18	RV12	RV9	RV24	RV21
<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
RV2	RV14	RV5	RV17	RV11	RV8	RV23	RV20
<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>

HIC (IC15)
(COMPONENT SIDE) -On the VA-83 Board-

Step 7

• Setting

BOARD CHANGE INFORMATION

OLD NAME	→	NEW NAME	SERIAL NUMBER
VA-83	→	VA-168	44001 and higher

Equipment: Vectorscope	Board: PR-176/VA-83/168 boards
------------------------	--------------------------------

• Preparation

• GAIN selector (side panel): 0 ↔ 9 ↔ 18
--

• Adjustment procedures

<ul style="list-style-type: none">• Test point : Vectorscope• Spec. : Adjust so that the luminescent spot is in the center. <p>1. Repeat the Steps 4 to 6.</p>

7-4-11. Flare Adjustment

- Note

- This adjustment should be performed after the correction data of the microcomputer is erased.

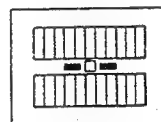
- Setting

Equipment: Waveform Monitor

Board: PR-176 board

- Preparation

- To be extended; PR-176 board
 - Cover the gray scale chart by the non-reflective cloth such as (velvet) which does not pass the light to be a reference of the black.
 - S3 (Y/G SELECT)/EN-79P: ENC
 - ●RV3 (G FLR)/PR-176
: Fully turn counterclockwise. (G FLR OFF)
 - Shoot the gray scale chart in full underscan's picture frame of the monitor by zooming a lens.
-



(Monitor)

- Adjustment procedures

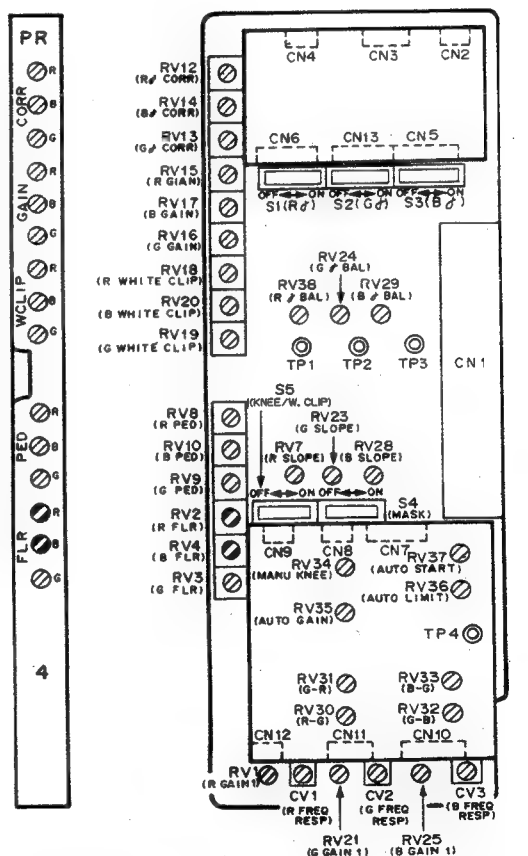
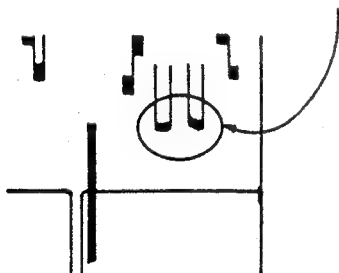
1. Test point : VIDEO OUT Terminal
Adj. point : Iris control
Spec. : $A=700\pm 10\text{mV}$



Open the iris control by one step from the above state. (1F stop OPEN)

2. Test point : Waveform Monitor
Adj. point : ●RV2 (R FLR)/PR-176
 ●RV4 (B FLR)/PR-176
Spec. :

Minimize the carrier leak

PR-176 BOARD
(PANEL SIDE)

PR-176 BOARD (COMPONENT SIDE)

7-4-12. PR GAIN Adjustment

Step 1.

• Note

- This adjustment should be performed after the 7-4-6. PR Pre Gain Adjustment is completed.

• Setting

Equipment: Dualtrace Oscilloscope

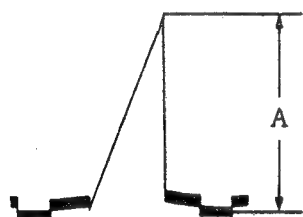
Board: PR-176 board

• Preparation

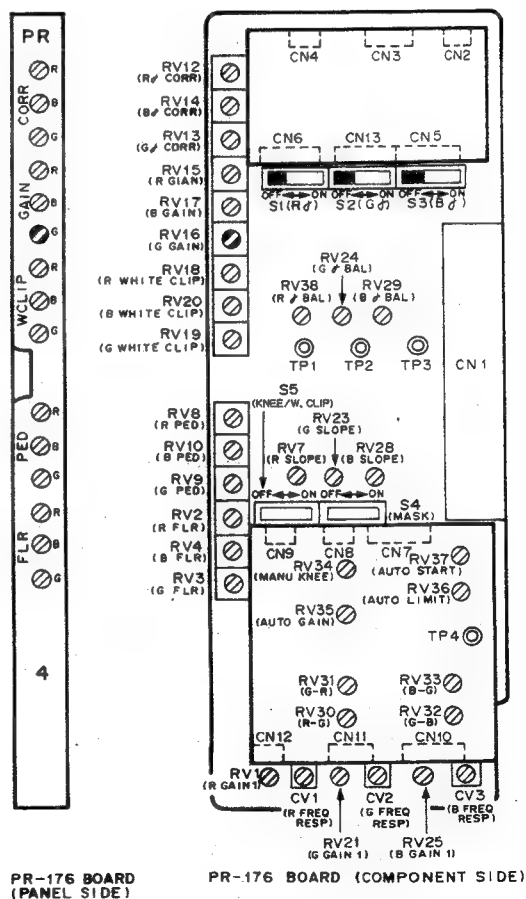
- To be extended; EN-79P board
- S3 (TEST SAW)/SG-152P: ON
- Set the switches on the PR-176 board as follows:
 - S1 (Rγ): OFF
 - S2 (Gγ): OFF
 - S3 (Bγ): OFF
 - S5 (WHITE CLIP & KNEE ON/OFF): OFF

• Adjustment procedures

- Test point : TP2/EN-79P
GND TPE/EN-79P
- Adj. point : ●RV16 (G GAIN)/PR-176
- Spec. : $A=0.7\pm0.02V$



TRIG:HD (TP14/Extension board)



Step 2

• Note

- This adjustment should be performed after the 7-4-6. PR Pre Gain Adjustment is completed.

• Setting

Equipment: Waveform Monitor

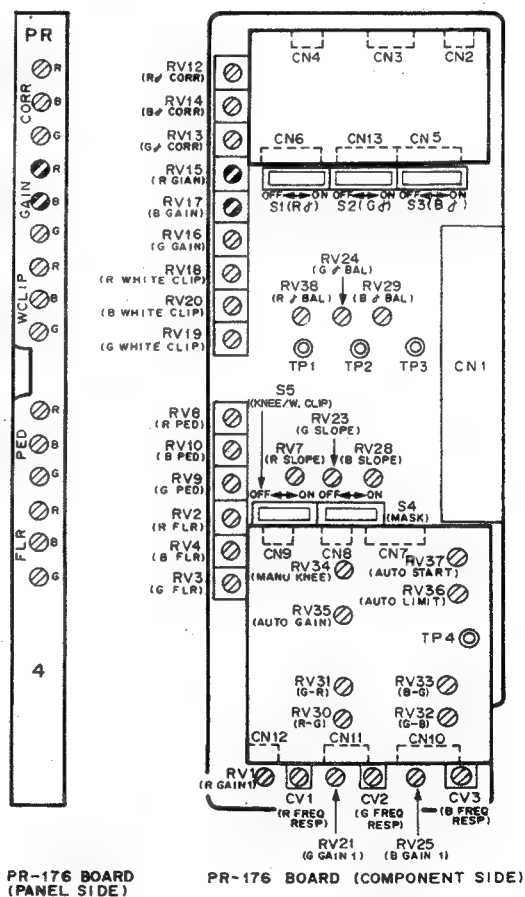
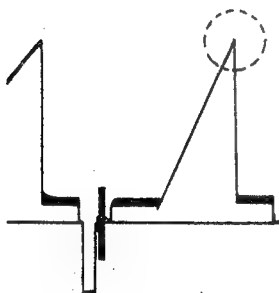
Board: PR-176 board

• Preparation

- Confirm that S3 (Y/G SELECT)/EN-79P is set to ENC.

• Adjustment procedures

- Test point : VIDEO OUT Terminal
- Adj. point : \odot RV15 (R GAIN)/PR-176
 \odot RV17 (B GAIN)/PR-176
- Spec. : Adjust using an waveform monitor so that the carrier leak of the peak level at the VIDEO OUT terminal is minimized.



• Note

- After adjustment is completed, set the switches as follows.
S3 (TEST SAW)/SG-152P: OFF
S5 (WHITE CLIP & KNEE ON/OFF)/PR-176: ON, S1(R_γ) → ON, S2(G_γ) → ON, S3(B_γ) → ON

7-4-13. Gamma Balance Adjustment

Step 1.

• Note

• This adjustment should be performed after the 7-4-12. PR GAIN Adjustment is completed.

• Setting

Equipment: Dualtrace Oscilloscope

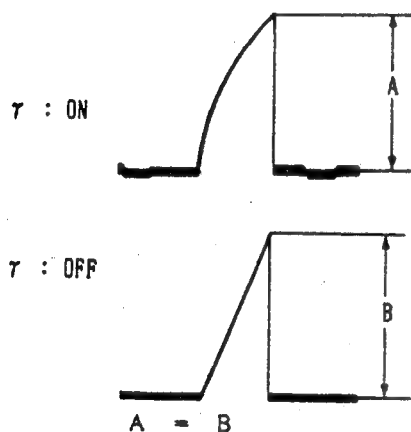
Board: PR-176 board

• Preparation

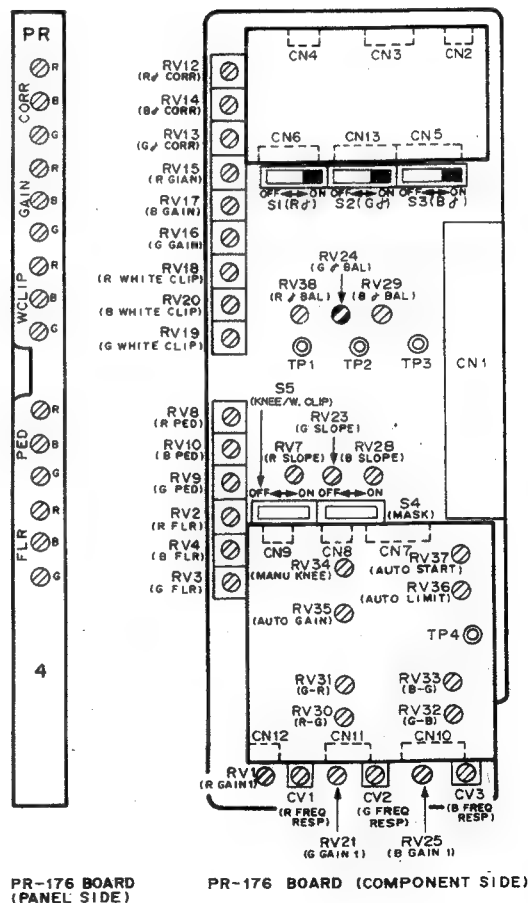
- To be extended; PR-176 board
- S3 (TEST SAW)/SG-152P: ON
- Set the switches on the PR-176 board as follows:
 - S1 (R γ): ON
 - S2 (G γ): ON
 - S3 (B γ): ON
 - S5 (WHITE CLIP & KNEE ON/OFF): OFF

• Adjustment procedures

- Test point : TP31/Extension board
- Adj. point : RV24 (G γ BAL)/PR-176
- Spec. : Adjust RV so that the peak level does not fluctuate irrespective of S2 (G γ) ON/OFF.



TRIG: HD (TP14/Extension board)



Step 2

• Note

- This adjustment should be performed after the 7-4-12. PR GAIN Adjustment is completed.

• Setting

Equipment: Waveform Monitor

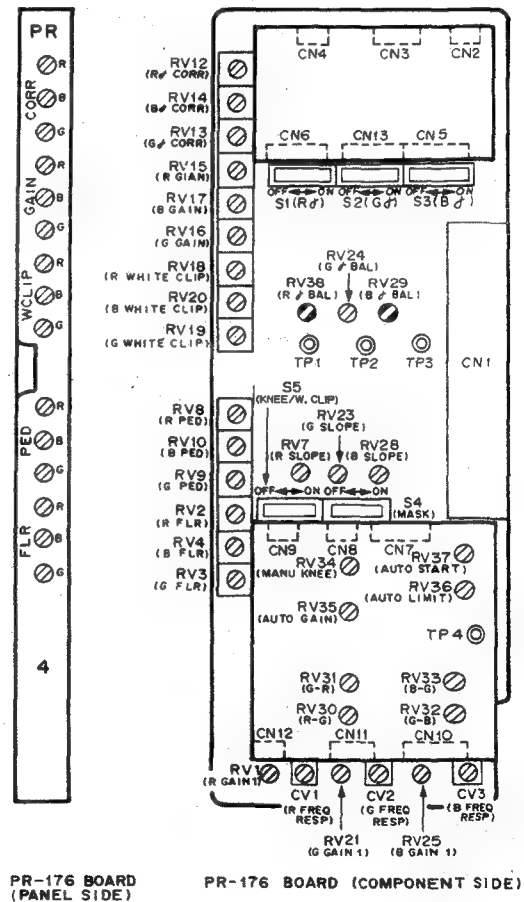
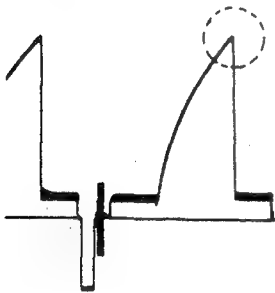
Board: PR-176 board

• Preparation

- Confirm that S3 (Y/G SELECT)/EN-79P is set to ENC.

• Adjustment procedures

- Test point : VIDEO OUT Terminal
- Adj. point : \odot RV38 (R γ BAL)/PR-176
 \odot RV29 (B γ BAL)/PR-176
- Spec. : Adjust using an waveform monitor so that the carrier leak of the peak level at the VIDEO OUT terminal is minimized.



PR-176 BOARD
(PANEL SIDE)

PR-176 BOARD (COMPONENT SIDE)

• Note

- After adjustment is completed, set the switches as follows.
S3 (TEST SAW)/SG-152P: OFF
S5 (WHITE CLIP & KNEE ON/OFF)/PR-176: ON

7-4-14. EN Y Level Adjustment

• Setting

Equipment: Waveform Monitor

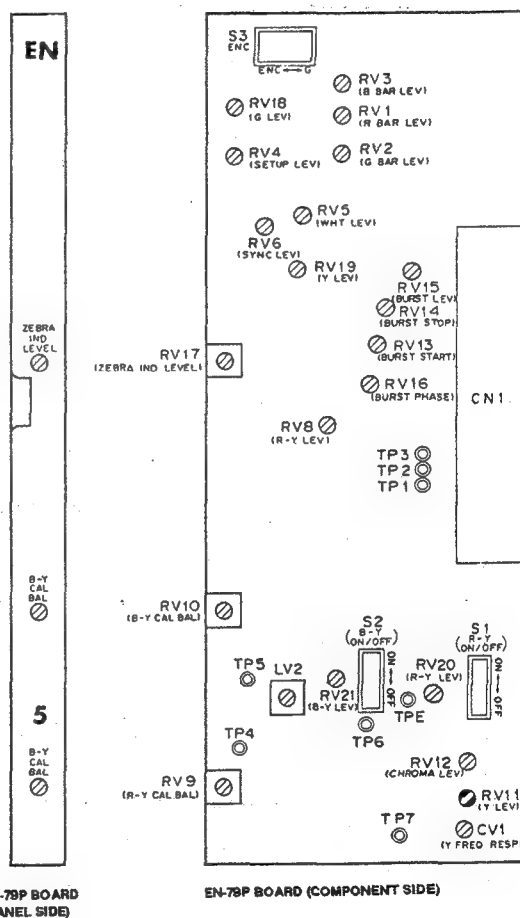
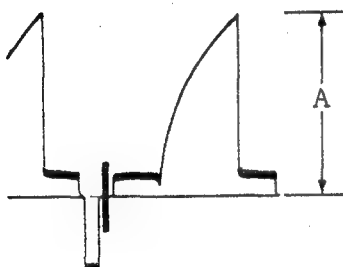
Board: EN-79P board

• Preparation

- S3 (Y/G SELECT)/EN-79P: ENC
- S3 (TEST SAW)/SG-152P: ON
- S5 (WHITE CLIP & KNEE ON/OFF)/PR-176: OFF
- OUTPUT/DCC sw (side panel): CAM/OFF

• Adjustment procedures

- Test point : VIDEO OUT Terminal
- Adj. point : RV11(Y LEV)/EN-79P
- Spec. : Adjust so that the level A of the test waveform at the VIDEO OUT terminal is $700 \pm 10 \text{ mV}$.



EN-79P BOARD (PANEL SIDE)

EN-79P BOARD (COMPONENT SIDE)

• Note

- After adjustment is completed, set the switches as follows:
 OUTPUT/DCC (side panel): CAM/OFF
 S3 (TEST SAW)/SG-152P: OFF
 S5 (WHITE CLIP & KNEE ON/OFF)/PR-176: ON

7-4-15. G Level Adjustment

• Setting

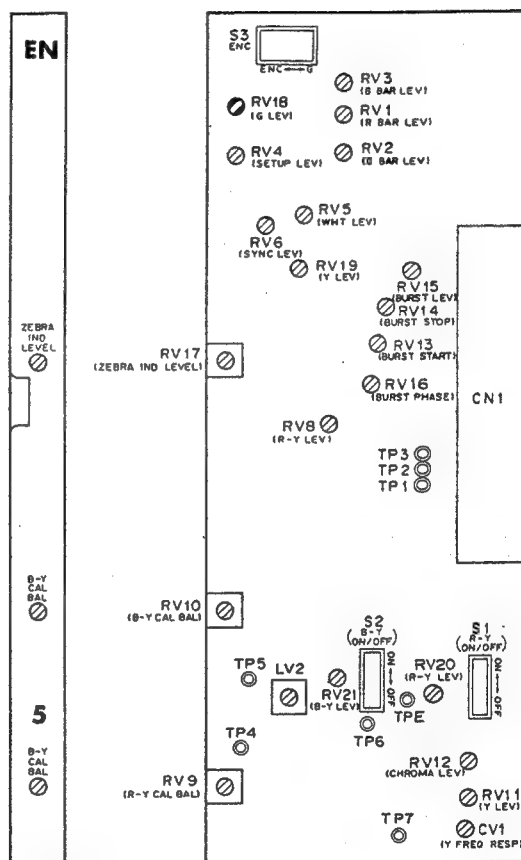
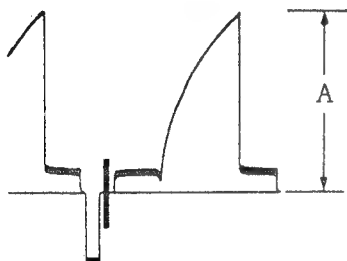
Equipment: Waveform Monitor	Board: EN-79P board
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• Preparation

- To be extended: EN-79P board
- S3 (Y/G SELECT)/EN-79P: G
- S3 (TEST SAW)/SG-152P: ON
- S5 (WHITE CLIP & KNEE ON/OFF)/PR-176: OFF

• Adjustment procedures

- Test point : Waveform Monitor
- Adj. point : ☒RV18(G LEV)/EN-79P
- Spec. : Adjust so that the level A of the test waveform at the VIDEO OUT terminal is $700 \pm 10\text{mV}$.



• Note

- After adjustment is completed, set the switches as follows:
S3 (TEST SAW)/SG-152P: OFF
S5 (WHITE CLIP & KNEE ON/OFF)/PR-176: ON
S3 (Y/G SELECT)/EN-79P: ENC

7-4-16. Gamma Correction Adjustment

Step 1

• Note

- This adjustment should be performed after the 7-4-13. Gamma Balance Adjustment is completed.

• Setting

Equipment: Waveform Monitor

Board: PR-176 board

• Preparation

- To be extended; PR-176 board
- S3 (Y/G SELECT)/EN-79P: G
- Set the switches on the PR-176 board as follows:

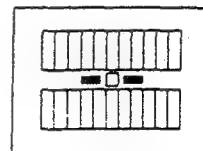
S1 (R_Y): ON

S2 (G_Y): ON

S3 (B_Y): ON

S5 (WHITE CLIP & KNEE ON/OFF): OFF

- Shoot the gray scale chart in full underscan's picture frame of the monitor by zooming a lens.

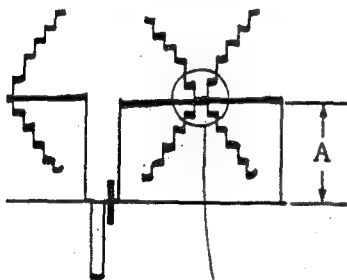


(Monitor)

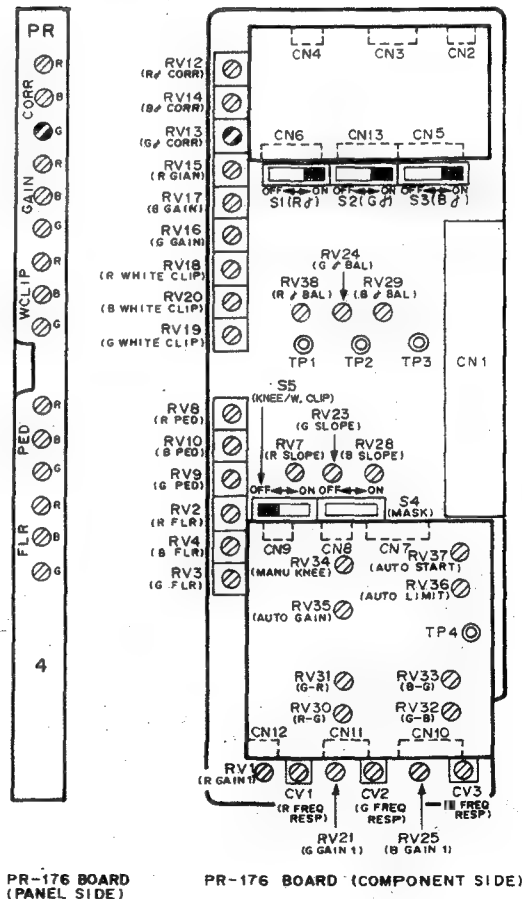
• Adjustment procedures

1. Test point : VIDEO OUT Terminal
Adj. point : Iris control
Spec. : $700 \pm 10 \text{ mV}$. (WHITE LEVEL)

2. Test point : VIDEO OUT Terminal
Adj. point : RV13 (G_Y CORR)/PR-176
Spec. : $420 \pm 20 \text{ mV}$



The level A at the cross point should be $420 \pm 20 \text{ mV}$



Step 2
• Setting

Equipment: Waveform Monitor

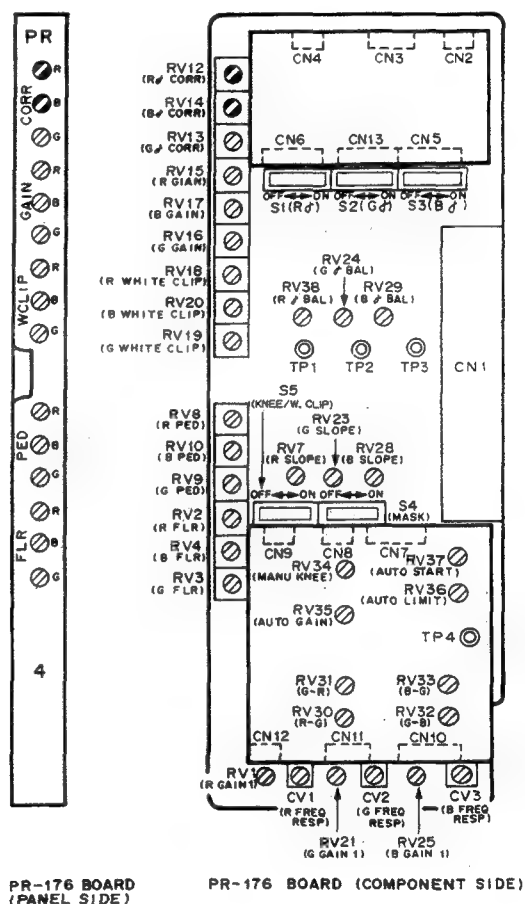
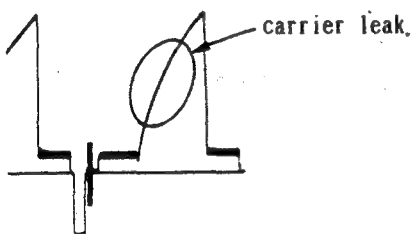
Board: PR-176 board

• Preparation

- S3 (Y/G SELECT)/EN-79P: ENC
- S3 (TEST SAW)/SG-152P: ON

• Adjustment procedures

- Test point : VIDEO OUT Terminal
- Adj. point : ●RV12(Ry CORR)/PR-176
●RV14(By CORR)/PR-176
- Spec. : Minimize the carrier leak.



PR-176 BOARD
(PANEL SIDE)

PR-176 BOARD (COMPONENT SIDE)

• Note

- After adjustment is completed, check that the specification in the 7-4-10 Black Set • Pedestal Adjustment is satisfied.
- After adjustment is completed, set the switches as follows.
S3 (TEST SAW)/SG-152P: OFF
S5 (WHITE CLIP & KNEE ON/OFF)/PR-176: ON

7-4-17. Knee White Clip Adjustment

Step 1

• Note

- This adjustment should be performed after the 7-4-6. PR Pre Gain Adjustment is completed.

• Setting

Equipment: Waveform Monitor	Board: PR-176 board
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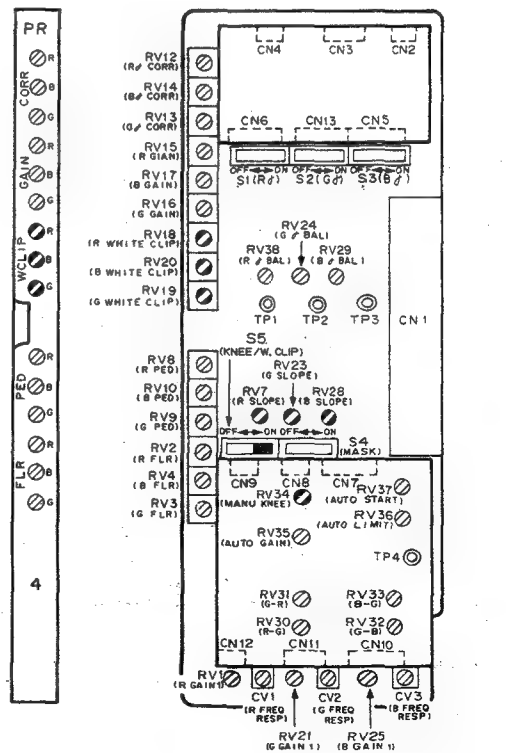
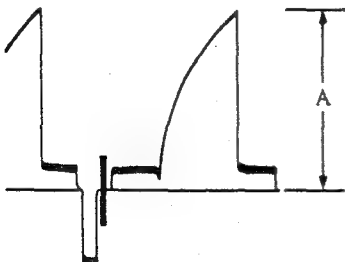
• Preparation

- To be extended; PR-176 board
- GAIN selector (side panel): 0
- OUTPUT/DCC sw (side panel): CAM/OFF
- S5 (WHITE CLIP & KNEE ON/OFF)/PR-176U: ON
- S3 (Y/G SELECT)/EN-79P: G
- S3 (TEST SAW)/SG-152P: ON I
- Fully turn the RVs on the PR-176 board clockwise.
 - RV19 (G WHITE CLIP)
 - RV18 (R WHITE CLIP)
 - RV20 (B WHITE CLIP)
 - RV23 (G SLOPE)
 - RV7 (R SLOPE)
 - RV28 (B SLOPE)

• Adjustment procedures

- Manual knee white clip adjustment
- Test point : VIDEO OUT Terminal
- Adj. point : RV34 (MANU KNEE)/PR-176 (PR-177)
- Spec. : Adjust the peak level at the VIDEO OUT terminal using a waveform monitor.

White clip Measure level ment point	750 mV	735 mV	720 mV
A (manual knee point)	690 mV	670 mV	670 mV



PR-176 BOARD
(PANEL SIDE)

PR-176 BOARD (COMPONENT SIDE)

- Note

- This adjustment should be performed after the 7-4-6. PR Pre Gain Adjustment is completed.


- Setting

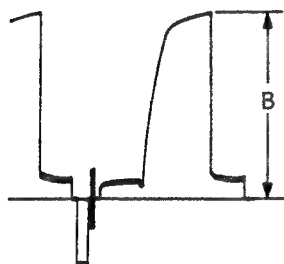
Equipment: Waveform Monitor	Board: PR-176 board
-----------------------------	---------------------

- Preparation

- GAIN selector (side panel): 9
- S3 (Y/G SELECT)/EN-79P: G

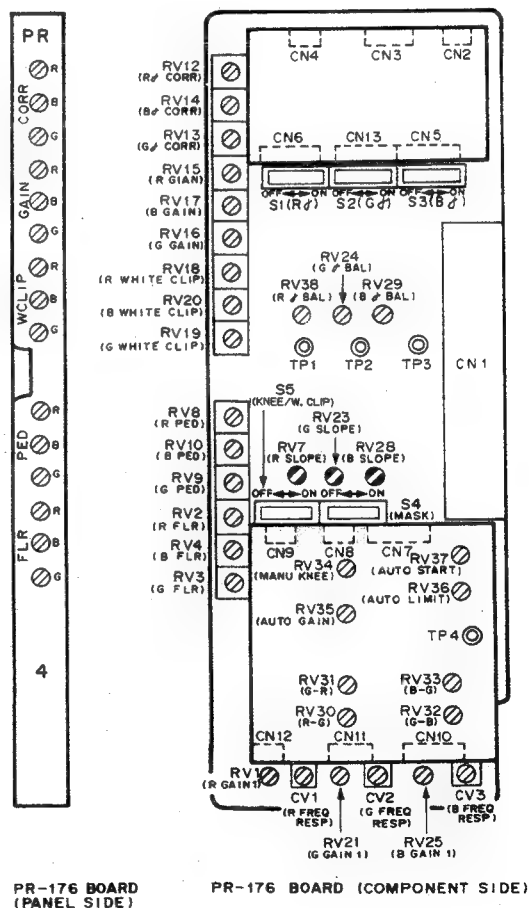
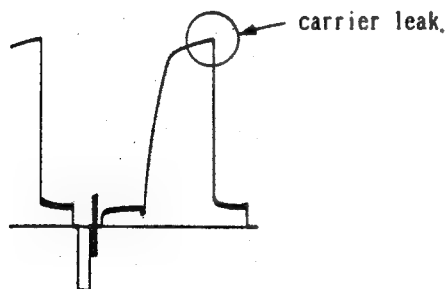
- Adjustment procedures

- Test point : VIDEO OUT Terminal
• Adj. point :  RV23 (G SLOPE)/PR-176
• Spec. : Adjust the peak level at the VIDEO OUT terminal.



White clip Measure level point	750 mV	735 mV	720 mV
B (knee slope)	770 mV	750 mV	750 mV

- 2. • S3 (Y/G SELECT)/EN-79P : ENC
- Test point : VIDEO OUT Terminal
- Adj. point : ●RV7 (R SLOPE)/PR-176
- RV28 (B SLOPE)/PR-176
- Spec. : Minimize the carrier leak.



Step 3

• Note

- This adjustment should be performed after the 7-4-6. PR Pre Gain Adjustmen is completed.

• Setting

Equipment: Waveform Monitor

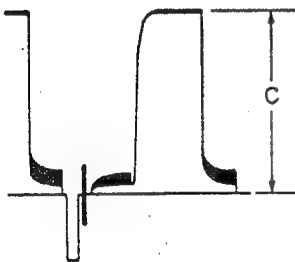
Board: PR-176 board

• Preparation

- S3 (Y/G SELECT)/EN-79P: G
- GAIN selector (side panel): 18

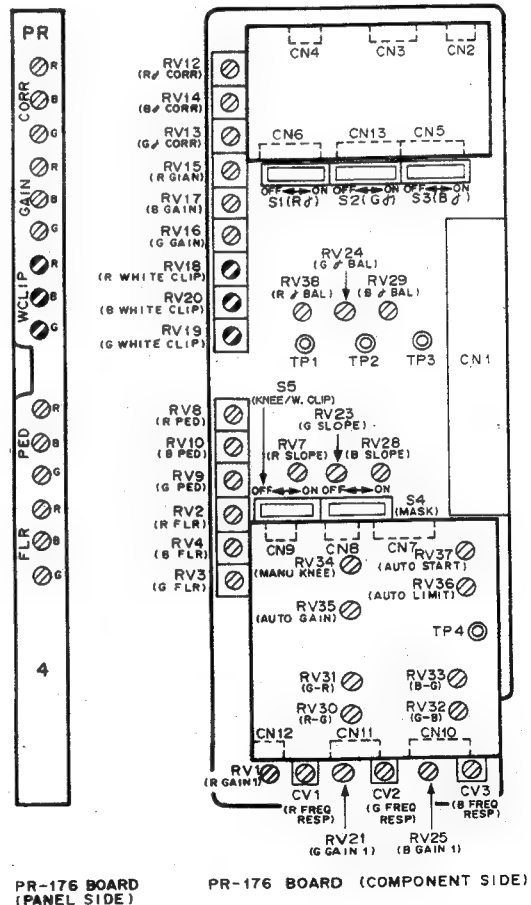
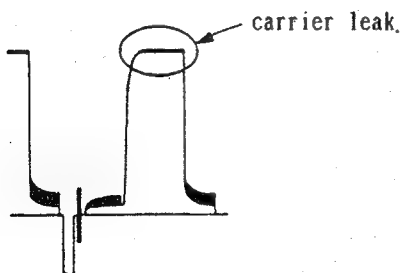
• Adjustment procedures

- Test point : VIDEO OUT Terminal
 - Adj. point : ●RV19 (G WHITE CLIP)/PR-176
 - Spec. : Adjust the white clip level at the VIDEO OUT terminal.



White clip level Measurement point	750 mV	735 mV	720 mV
C (white clip)	750 mV	735 mV	720 mV

- S3 (Y/G SELECT)/EN-79P: ENC
 - Test point : VIDEO OUT Terminal
 - Adj. point : ●RV18 (R WHITE CLIP)/PR-176
●RV20 (B WHITE CLIP)/PR-176
 - Spec. : Minimize the carrier leak.



Step 4

• Note

• This adjustment should be performed after the 7-4-6. PR Pre Gain Adjustment is completed.

• Setting

Equipment: Dualtrace Oscilloscope

Board: PR-176 board

• Preparation

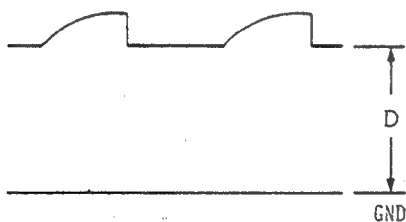
- GAIN selector (side panel): 18
- OUTPUT/DCC sw (side panel): CAM/OFF

• Adjustment procedures

Auto knee adjustment

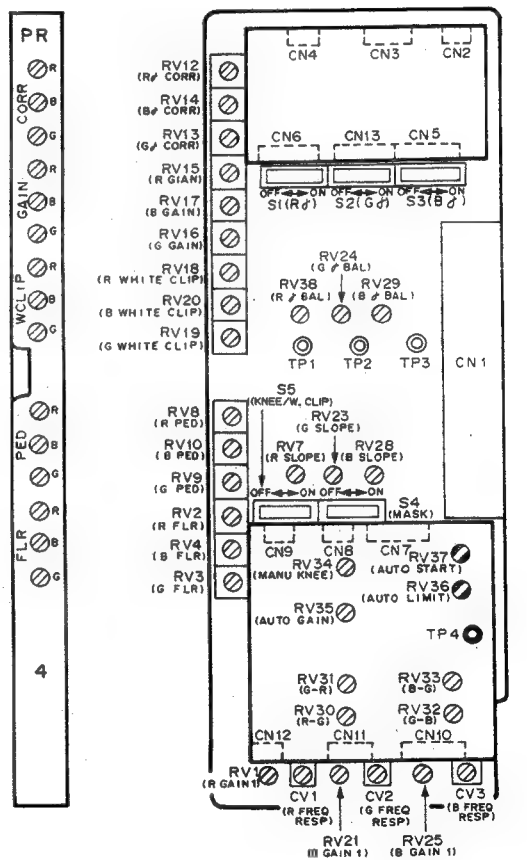
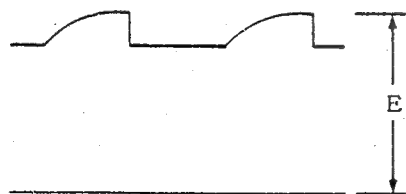
- Test point : TP4 (DCC SET)/PR-176 (PR-177)
 - Adj. point : RV37 (AUTO START)/PR-176 (PR-177)
 - Spec. :

White clip level	750 mV	735 mV	720 mV
Measurement point			
D (DC at TP4)	2.65Vdc	2.60Vdc	2.60Vdc



- Test point : TP4 (DCC SET)/PR-176 (PR-177)
 - Adj. point : RV36 (AUTO LIMIT)/PR-176 (PR-177)

White clip level	750 mV	735 mV	720 mV
Measurement point			
E (Peak at TP4)	2.95Vdc	2.90Vdc	2.90Vdc



PR-176 BOARD
(PANEL SIDE)

PR-176 BOARD (COMPONENT SIDE)

Step 5

• Note

- This adjustment should perform after the 7-4-6. PR Pre Gain Adjustment is completed.

• Setting

Equipment: Waveform Monitor

Board: PR-176 board

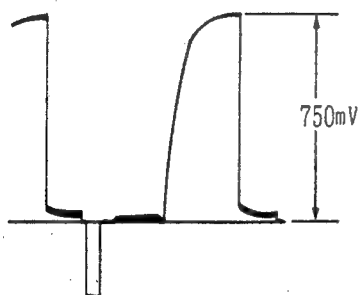
• Preparation

- OUTPUT/DCC sw (side panel): CAM/ON
- S3 (Y/G SELECT)/EN-79P: G

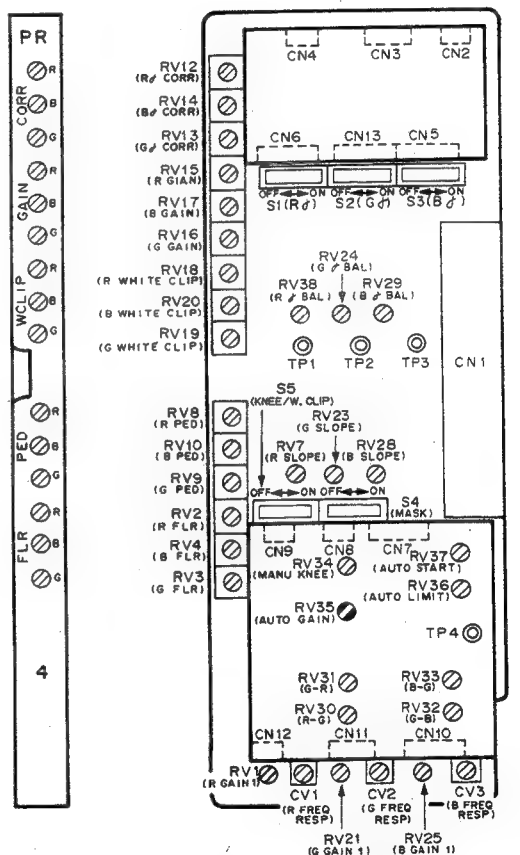
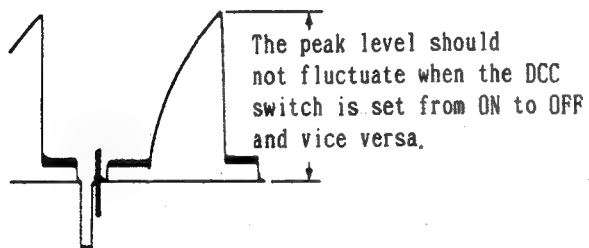
• Adjustment procedures

Auto knee gain adjustment

- Test point : VIDEO OUT Terminal
- Adj. point : ●RV35 (AUTO GAIN)/PR-176(PR-177)
- Spec. :
- 1. GAIN selector (side panel): 18
For white clip is 750mV



- 2. GAIN selector (side panel): 0
For white clip is 735mV or 720mV
DCC-ON → OFF



PR-176 BOARD
(PANEL SIDE)

PR-176 BOARD (COMPONENT SIDE)

- Note

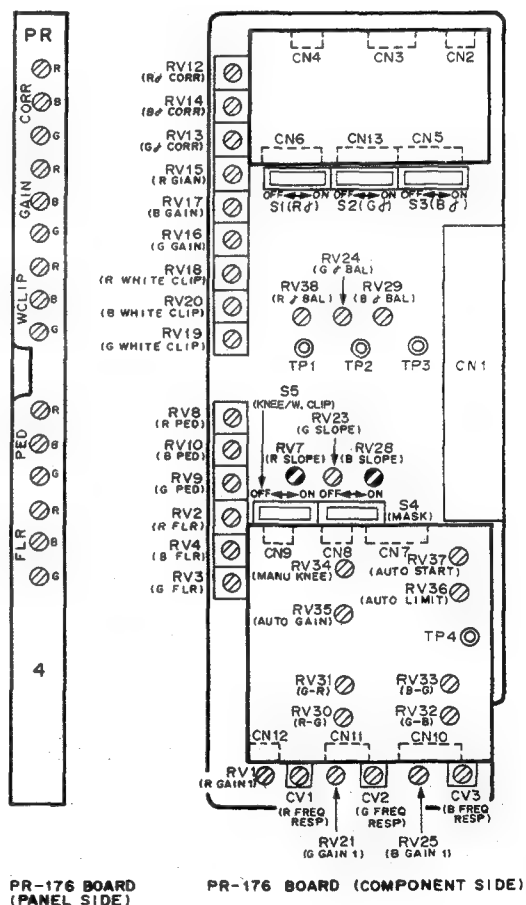
- Setting

Board: PR-176 board

- GAIN selector (side panel): 18
- OUTPUT/DCC sw: CAM/ON
- S3 (Y/G SELECT)/EN-79P: ENC

- Test point : VIDEO OUT Terminal
- Adj. point : ●RV7 (R SLOPE)/PR-176
●RV28 (B SLOPE)/PR-176

Minimize the carrier leak.



- After adjustment is completed, set the switches as follows.
GAIN selector (side panel): 0
OUTPUT/DCC sw (side panel): CAM/OFF
S3 (TEST SAW)/SG-152P: OFF

7-4-18. Color Bars Adjustment

Step 1

• Note

- This adjustment should be performed after the 7-4-13. EN Y Level Adjustment is completed.

• Setting

Equipment: Waveform Monitor

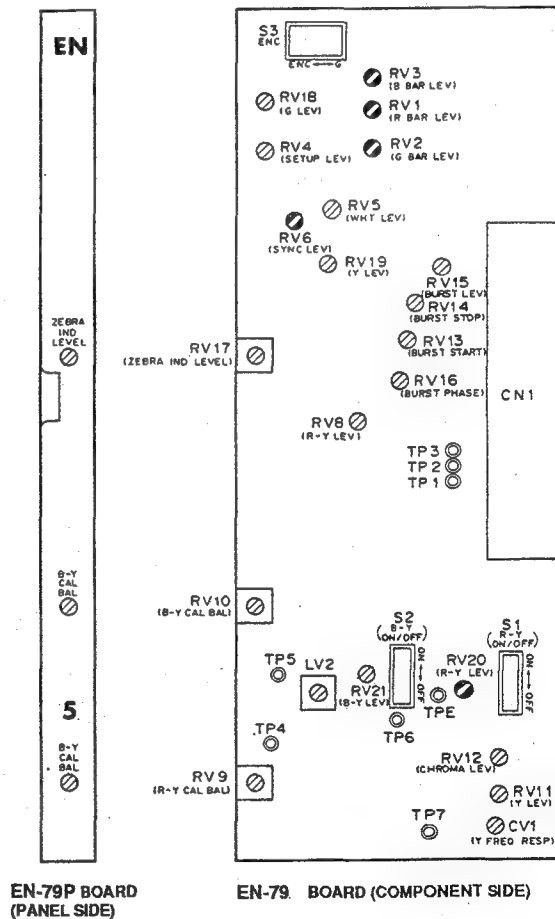
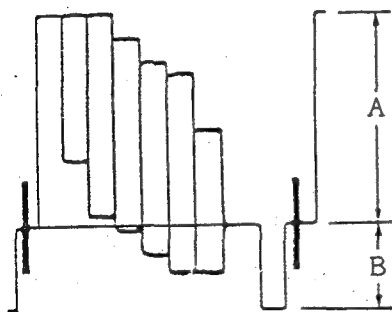
Board: EN-79P board

• Preparation

- To be extended; EN-79P board
- OUTPUT/DCC sw (side panel): BARS /OFF
- S3 (Y/G SELECT) / EN-79P: ENC

• Adjustment procedures

- Test point : VIDEO OUT Terminal
- Adj. point : • White level
 - RV2 (G BAR LEV)/EN-79P
 - RV1 (R BAR LEV)/EN-79P
 - RV3 (B BAR LEV)/EN-79P
 - Sync level
 - RV6 (SYNC LEV)/EN-79P
- Spec. : White level
 - A = $700 \pm 10\text{mV}$
 - Sync level
 - B = $300 \pm 10\text{mV}$




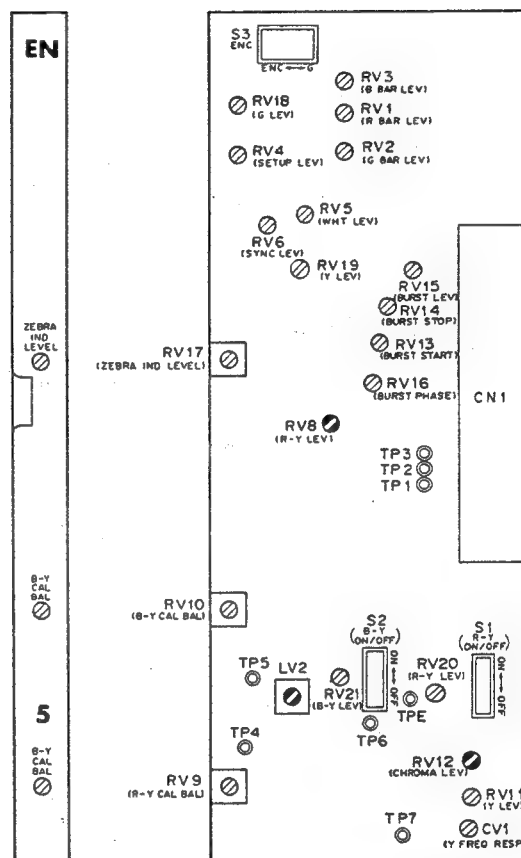
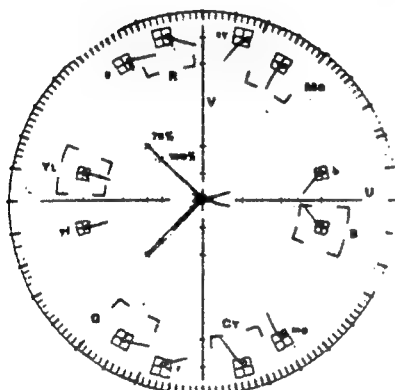
Step 2.

• Setting

Equipment: Vectorscope	Board: EN-79P board
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• Adjustment procedures

- Test point : Vectorscope
- Adj. point :
 - RV8 (R-Y LEV)/EN-79P
 - RV12 (CHROMA LEV)/EN-79P
 - LV2 (SC QUAD)/EN-79P
- Spec. : Set the luminescent spot in mark  on the vectorscope.



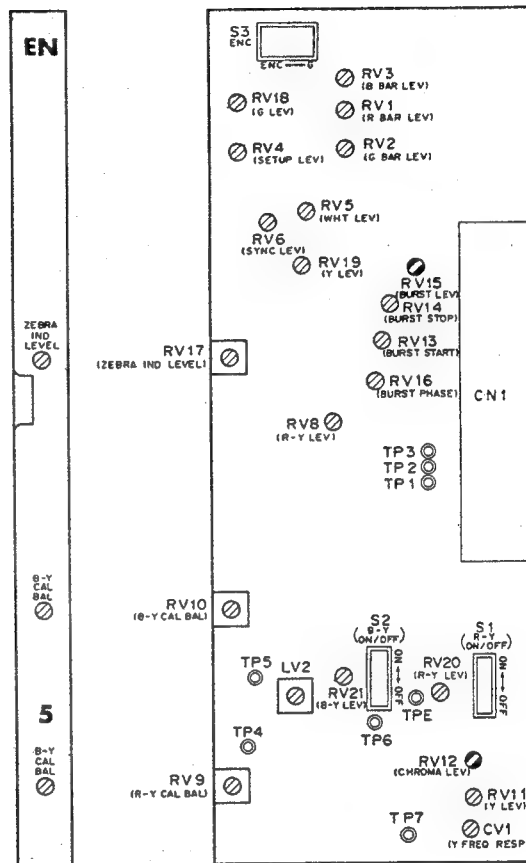
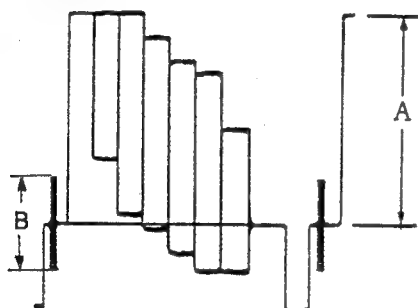
EN-79P BOARD
(PANEL SIDE)

EN-79P BOARD (COMPONENT SIDE)

- Setting

Board: EN-79P board

- Test point : VIDEO OUT Terminal
- Adj. point : \odot RV12 (CHROMA LEV)
/EN-79P
 \odot RV15 (BURST LEV)
/EN-79P
- Spec. : Adjust so that the yellow peak level A is $700 \pm 10\text{mV}$ and the burst level B is $300 \pm 10\text{mV}$



EN-79P BOARD (COMPONENT SIDE)

- After adjustment is completed, the luminescent spot on the setup 0's vectorscope is located in mark . For vectorscopes other than the above, the spot is not located in mark .
- After adjustment is completed, set the OUTPUT/DCC switch (side panel) to CAM/OFF.

7-4-19. VTR Y Adjustment

• Setting

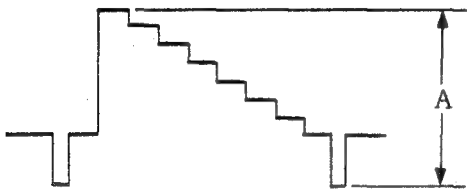
Equipment: Dualtrace Oscilloscope	Board: EN-79P board
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• Preparation


<ul style="list-style-type: none"> • To be extended; EN-79P board • OUTPUT/DCC SW: BARS/OFF

• Adjustment procedures

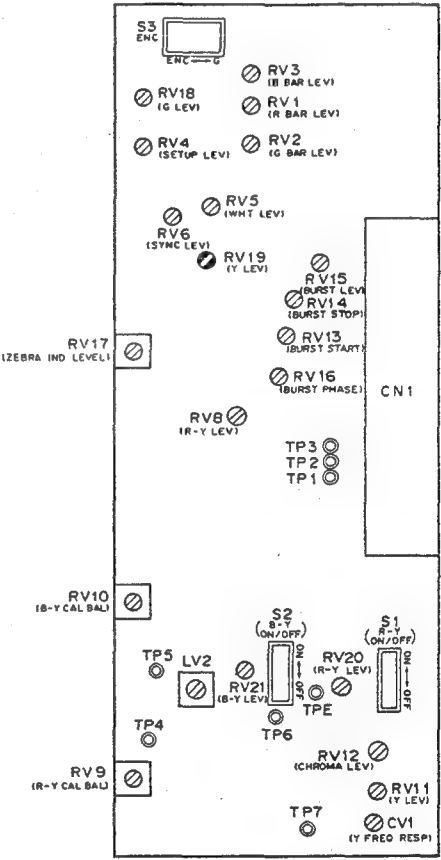
- Test point : TP5 (GND: TP6)
/Extension board
- Adj. point : ● RV19 (VTR Y LEV)
/EN-79P
- Spec. : $A = 1.0 \pm 0.01V$



TRIG: HD (TP14/Extension board)



**EN-79P BOARD
(PANEL SIDE)**



EN-79P BOARD (COMPONENT SIDE)

• Note

• After adjustment is completed, set the OUTPUT/DCC switch to CAM/OFF.
--

7-4-20. VTR R-Y Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

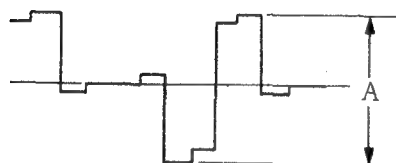
Board: EN-79P board

• Preparation

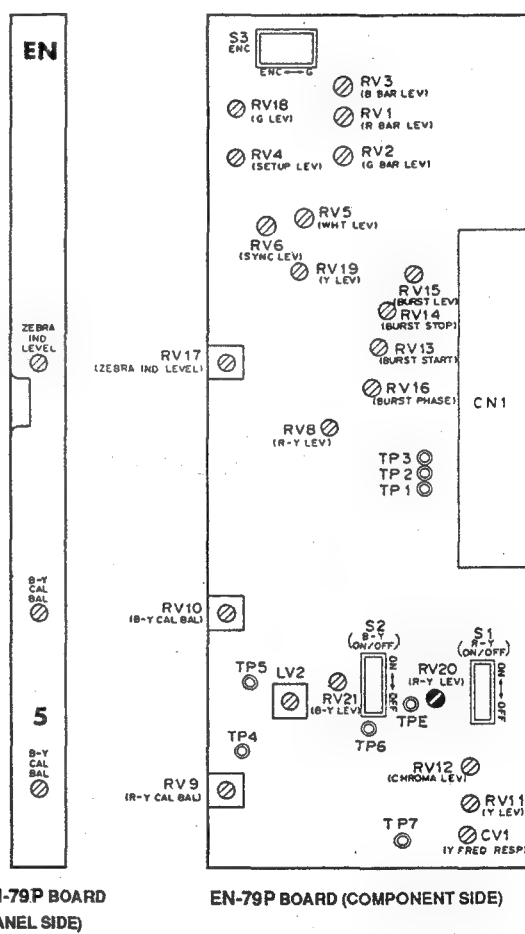
- To be extended; EN-79P board
- OUTPUT/DCC sw: BARS/OFF

• Adjustment procedures

- Test point : TP7(GND: TP8)
/Extension board
- Adj. point : ● RV20(R-Y LEV)/EN-79P
- Spec. : $A = 525 \pm 5\text{mV}$



TRIG: HD (TP14/Extension board)



• Note

- After adjustment is completed, set the OUTPUT/DCC switch to CAM/OFF.

7-4-21. VTR B-Y Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

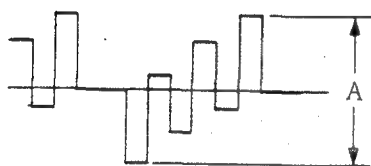
Board: EN-79P board

• Preparation

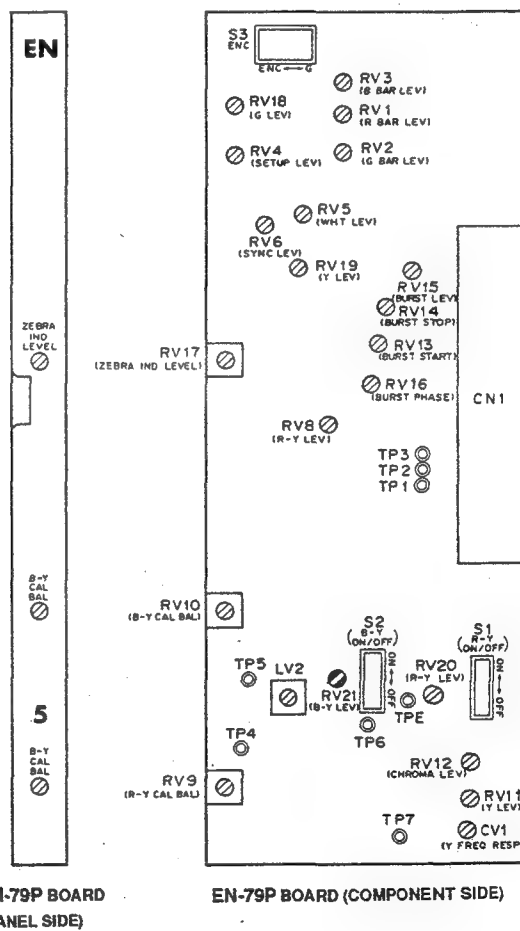
- To be extended; EN-79P board
- OUTPUT/DCC sw: BARS/OFF

• Adjustment procedures

- Test point : TP9 (GND: TP10)
/Extension board
- Adj. point : ● RV21 (B-Y LEVEL)
/EN-79P
- Spec. : $A = 525 \pm 5\text{mV}$



TRIG: HD (TP14/Extension board)



• Note

- After adjustment is completed, set the OUTPUT/DCC switch to CAM/OFF.

7-4-22. Zebra Level Adjustment

- Setting

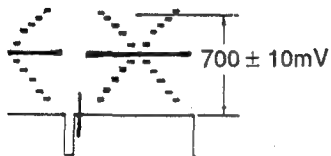
Equipment: Waveform Monitor	Board: EN-79P board
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- Preparation

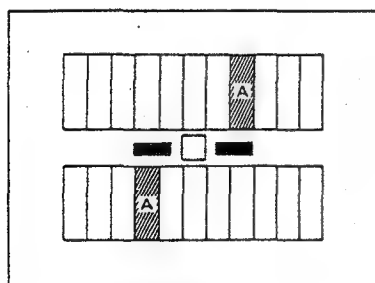
- To be extended; EN-79P board
- S3 (Y/G SELECT) / EN-79P: ENC
- ZEBRA sw (viewfinder): ON
- Shoot the gray scale chart in full underscan's picture frame by zooming a lens.
- S5 (WHITE CLIP & KNEE ON/OFF) / PR-176: OFF

- Adjustment procedures

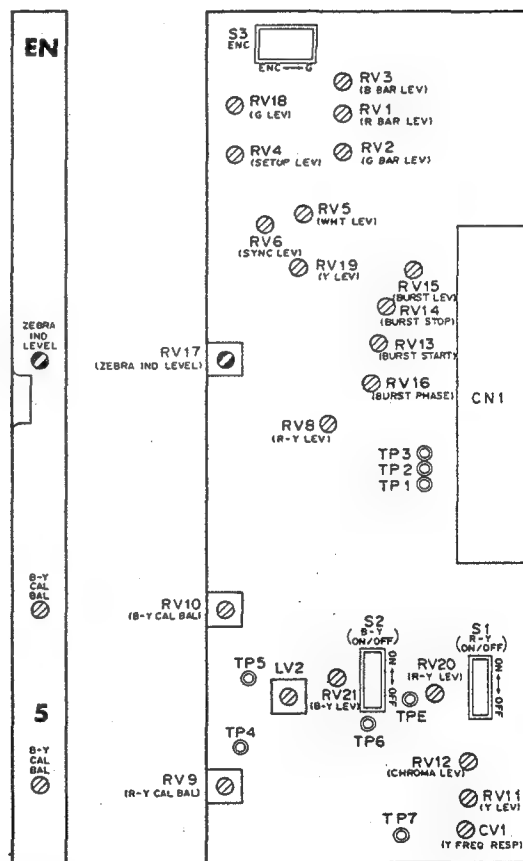
1. • Test point : VIDEO OUT Terminal
• Adj. point : IRIS control
• Spec. : $700 \pm 10\text{mV}$



- 2. • Test point : VIEWFINDER
- Adj. point :  RV17/EN-79P (ZEBRA IND LEVEL)
- Spec. : Adjust so that a striped pattern appears at portions A.



(Viewfinder screen)



**EN-79P BOARD
(PANEL SIDE)**

EN-79P BOARD (COMPONENT SIDE)

7-5. DETAIL SIGNAL SYSTEM ADJUSTMENT

7-5-1. White Clip Adjustment

• Setting

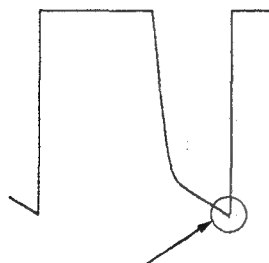
Equipment: Dualtrace Oscilloscope	Board: IE-30AP board
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• Preparation

- To be extended; IE-30AP board
- S3 (Y/G SELECT)/EN-79P: ENC
- S1 (DTL ON/OFF)/IE-30AP: ON
- GAIN selector (side panel): 18
- S3 (TEST SAW)/SG-152P: ON
- S5 (KNEE/W CLIP)/PR-176: ON

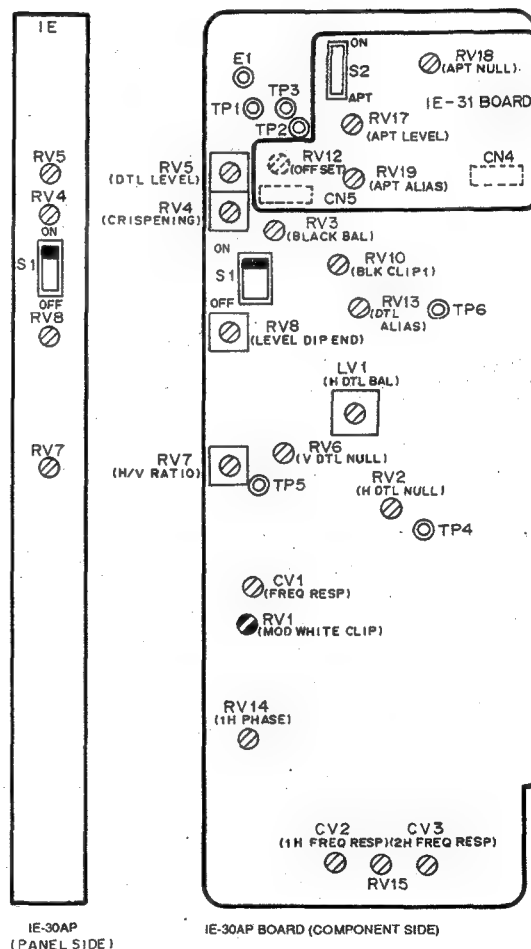
• Adjustment procedures

- Test point : TP45/Extension board
- Adj. point : ● RV1 (MOD WHITE CLIP)
/IE-30AP
- Spec. :



Adjust so that the peak value of the test waveform reaches just before the clipping point.

TRIG: HD (TP16/Extension board)



• Note

- After adjustment is completed, set the GAIN selector (side panel) to 0.

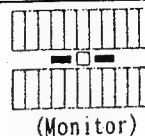
7-5-2. V DTL Null Adjustment

• Setting

Equipment: Dualtrace Oscilloscope	Board: IE-30AP board
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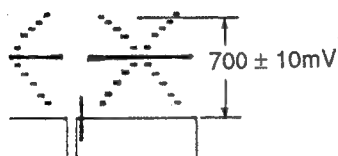
• Preparation

- To be extended; IE-30AP board
- S3 (Y/G SELECT) / EN-79P: ENC
- S1 (DTL ON/OFF) / IE-30AP: ON
- Shoot the gray scale chart in full underscan's picture frame of the monitor by zooming a lens.

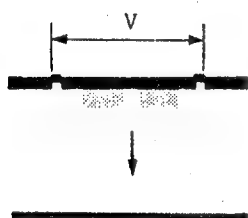


• Adjustment procedures

- Test point : VIDEO OUT Terminal
- Adj. point : IRIS control
- Spec. : $700 \pm 10\text{mV}$ (WHITE LEVEL)

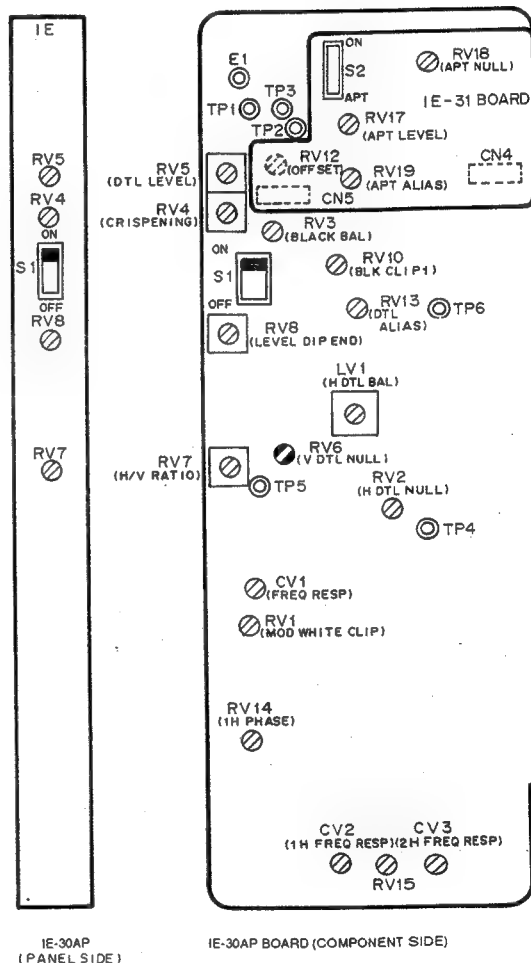


- Test point : TP5/IE-30AP
- Adj. point : RV6/ (VDTL NULL)/IE-30AP
- Spec. :



Make flat.

TRIG: VD (TP17/Extension board)



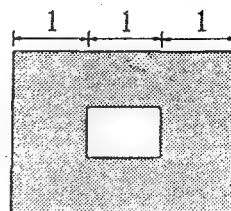
7-5-3. H DTL Null Adjustment

• Setting

Equipment: Dualtrace Oscilloscope	Board: IE-30AP board
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• Preparation

- To be extended; IE-30AP board
- S3 (Y/G SELECT) / EN-79P: ENC
- S1 (DTL ON/OFF)/IE-30AP: ON
- Shoot the white window chart using a zoom lens as illustrated below.



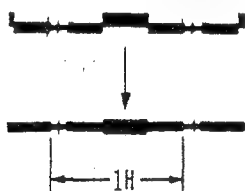
(Monitor)

• Adjustment procedures

1. • Test point : VIDEO OUT Terminal
• Adj. point : IRIS CONTROL
• Spec. : $700 \pm 10\text{mV}$ (WHITE LEVEL)

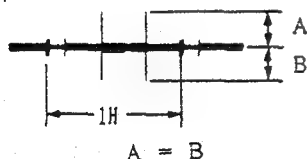


2. • Test point : TP4/IE-30AP
• Adj. point : RV2 (H DTL NULL) /IE-30AP

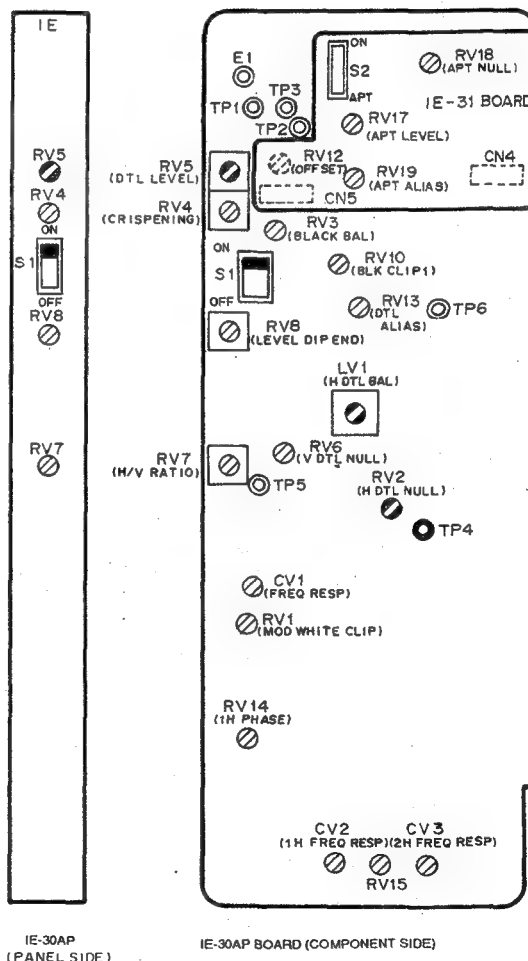


Make flat.
TRIG: HD (TP16/Extension board)

3. • RV5 (DTL LEVEL)/IE-30AP: Fully turn clockwise
4. • Test point : TP4/IE-30AP
• Adj. point : LV1 (H DTL BAL) /IE-30AP
• Spec. : $A = B$



TRIG: HD (TP16/Extension board)



• Note

- After adjustment is completed, perform the 7-5-4 Black Balance Adjustment.

7-5-4. Black Balance Adjustment

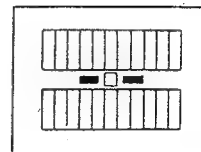
• Setting

Equipment: Dualtrace Oscilloscope

Board: IE-30AP board

• Preparation

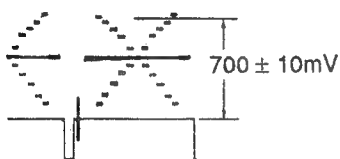
- To be extended; IE-30AP board
- S3 (Y/G SELECT) / EN-79P: ENC
- S1 (DTL ON/OFF) / IE-30AP: ON
- Turn RVs on the IE-30AP board as follows:
 - RV4 (CRISPENING) : Fully clockwise
 - RV5 (DTL LEVEL) : Fully clockwise
 - RV8 (LEVEL DEPEND) : Fully counterclockwise
 - RV7 (H/V RATIO) : mechanical center
- Shoot the gray scale chart in full underscan's picture frame by zooming a lens.



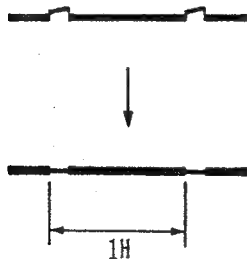
(Monitor)

• Adjustment procedures

1. • Test point : VIDEO OUT Terminal
 - Adj. point : IRIS CONTROL
 - Spec. : $700 \pm 10\text{mV}$ (WHITE LEVEL)

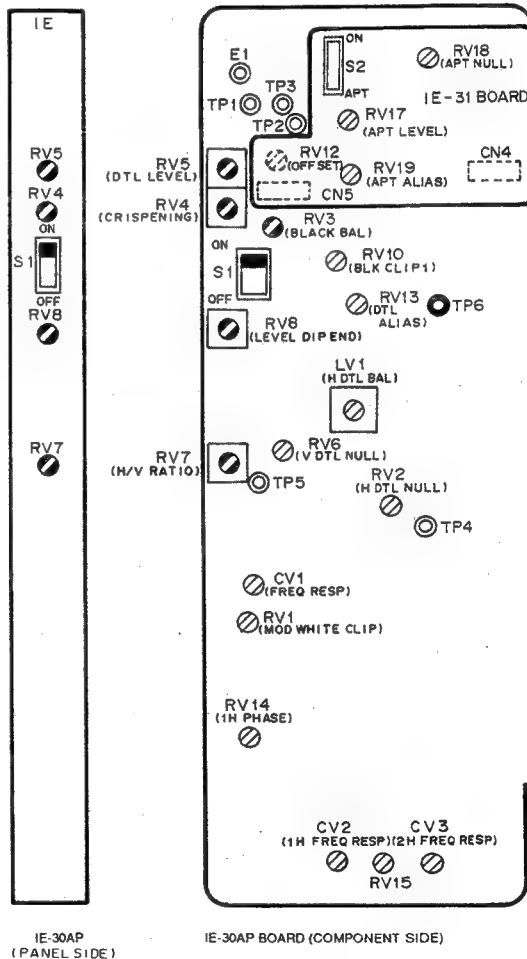


2. • Test point : TP6/IE-30AP
 - Adj. point : RV3 (BLACK BAL) / IE-30AP
 - Spec. :



Make flat.

TRIG: HD (TP16/Extension board)



• Note

- After adjustment is completed, perform the 7-5-10 Level Dependent Adjustment.

7-5-5. Aperture Null Adjustment

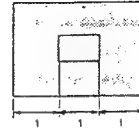
• Setting

Equipment: Dualtrace Oscilloscope

Board: IE-30AP board

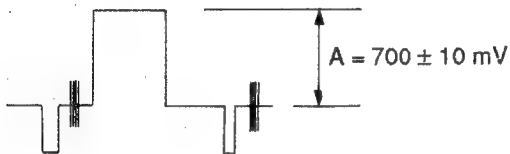
• Preparation

- To be extended; IE-30AP board
- S1 (DTL ON/OFF)/IE-30AP: OFF
- S2 (APERTURE)/IE-30AP: ON
- Shoot the white window chart using a zoom lens as illustrated below.

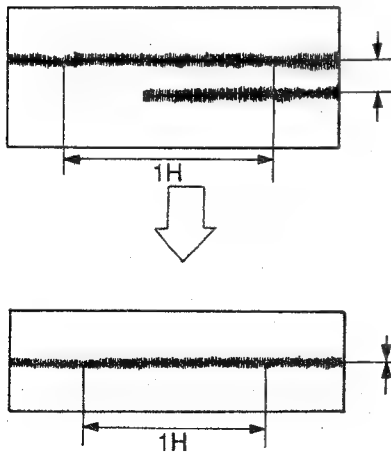


• Adjustment procedures

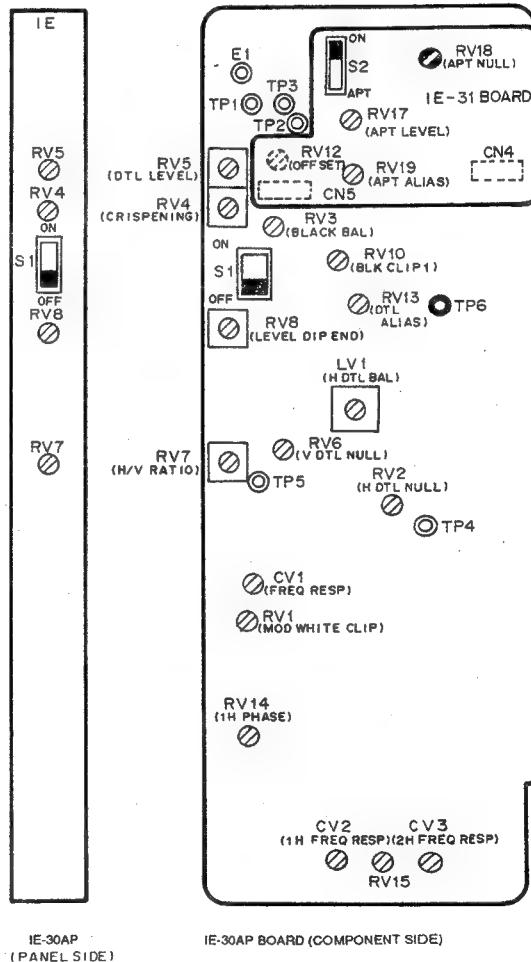
1. • Test point : VIDEO OUT Terminal
• Adj. point : IRIS CONTROL
• Spec. : $A = 700 \pm 10 \text{ mV}$



2. • Test point : TP6/IE-30AP
• Adj. point : RV18 / IE-31
• Spec. : Obtain a flat waveform



TRIG:HD (TP16/Extension board)



7-5-6. Resolution Adjustment

• Setting

Equipment: Waveform Monitor	Board: TG-57P/VA-163 board
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• Preparation

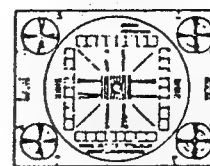
- Shoot the multi-burst chart in full underscan's picture frame by zooming a lens.

—VA-163 board only (Serial No.44001 and higher)

- S1 (DTL ON/OFF)/IE-30P: OFF

- S2 (APERTURE)/IE-30P: OFF

- Pan so that the 8.9 MHz of the multi-burst chart is positioned at center on the monitor screen.



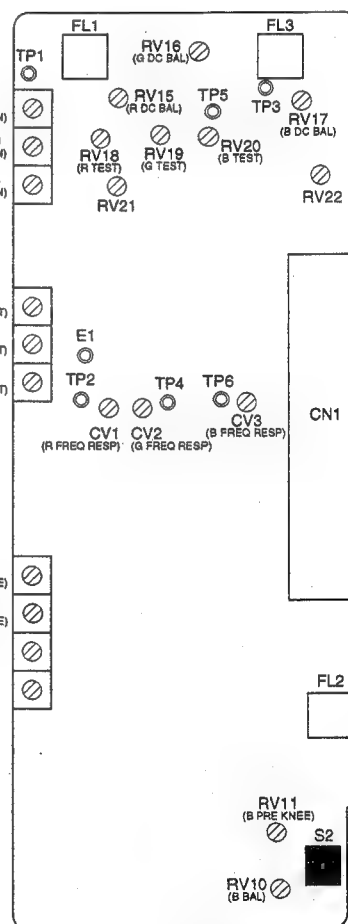
(Monitor)

• Adjustment procedures

- Test point : VIDEO OUT Terminal
 - Adj. point : IRIS CONTROL
 - Spec. : $700 \pm 10\text{mV}$
- Test point : Monitor
 - Adj. point : Serial No.41954 through 43999
RV1 (SHD π PHASE)/TG-57P
Serial No.44001 and higher
S2(SHD π PHASE)/VA-168
 - Spec. : 1. Slightly pan the camera so that the resolution is optimum.
2. Adjust so that the resolution is maximized.
3. Repeat Steps 1 and 2 so that the resolution is more than 700 TV lines.



VA-168 BOARD
(PANEL SIDE)



VA-168 BOARD (COMPONENT SIDE)

7-5-7. Aperture Alias Adjustment

• Setting

Equipment: Waveform monitor	Board: IE-30AP board
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• Preparation

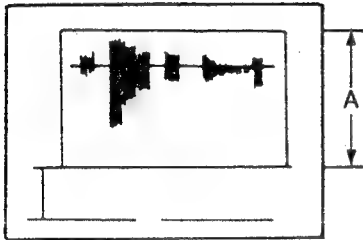
- To be extended; IE-30AP board
- S1 (DTL ON/OFF)/IE-30AP : OFF
- S2 (APERTURE) / IE-30AP : ON
- Shoot the multi-burst chart using a zoom lens.
- Pan so that the 8.9 MHz of the multi-burst chart is positioned at center on the monitor screen.



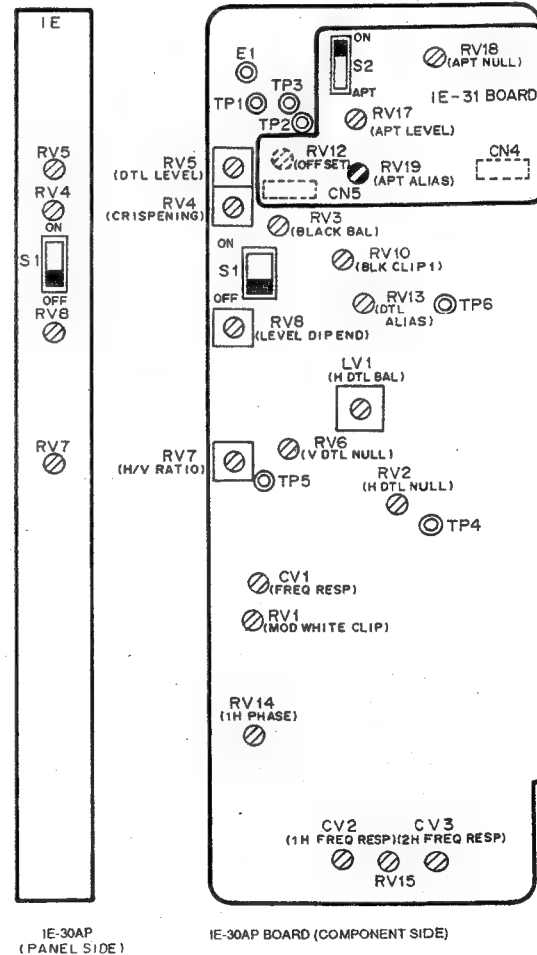
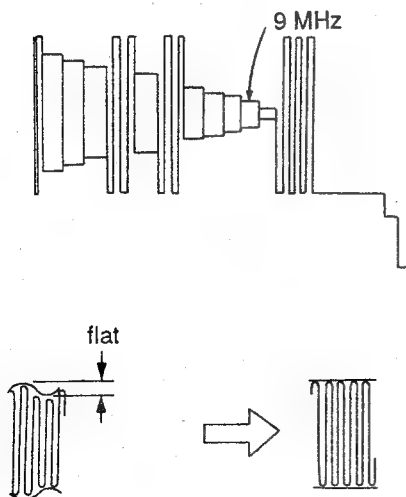
(Monitor)

• Adjustment procedures

1. • Test point : VIDEO OUT Terminal
• Adj. point : IRIS CONTROL
• Spec. : $A = 640 \pm 10 \text{ mV}$



2. • Test point : VIDEO OUT Terminal
• Adj. point : RV19 (APT ALIAS)/ IE-31
• Spec. : Adjust so that the 9 MHz signal of multi-burst chart becomes horizontally flat.



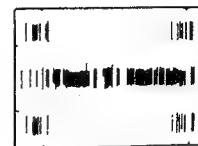
7-5-8. DTL Alias Adjustment

- Setting

Equipment: Waveform monitor	Board: IE-30AP board
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- Preparation

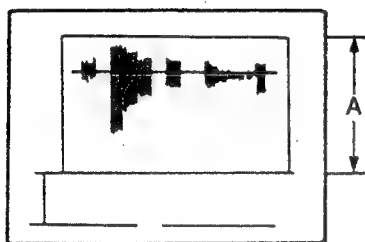
- To be extended; IE-30AP board
- S1 (DTL ON/OFF) switch / IE-30AP board: ON
- S2 (APERTURE) switch / IE-31 board: OFF
- ●RV5 (DTL) / IE-30AP board → fully clockwise
- ●RV7 (H/V RATIO) / IE-30AP board fully clockwise
- Lens Zoom : Underscanned picture frame on the monitor = chart frame
- Pan so that the 9MHz of the multi-burst chart is positioned at center on the monitor screen.



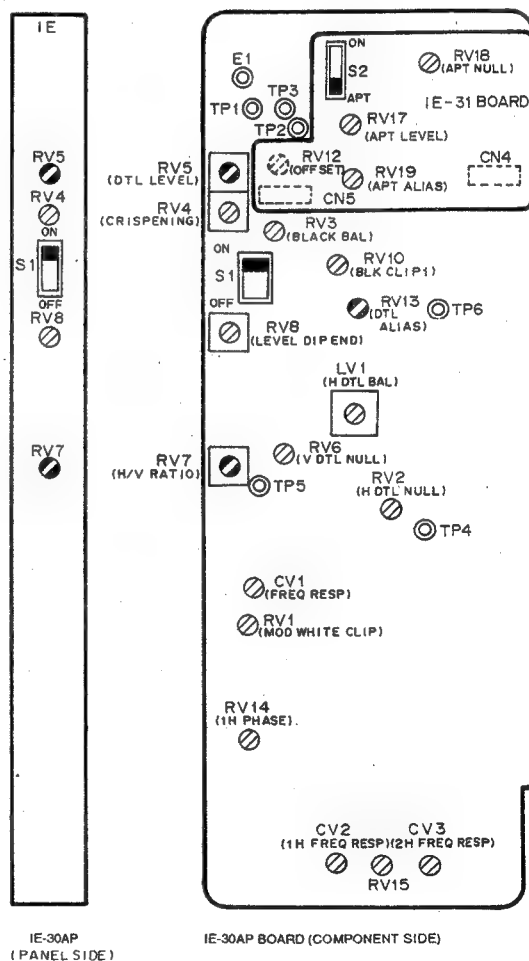
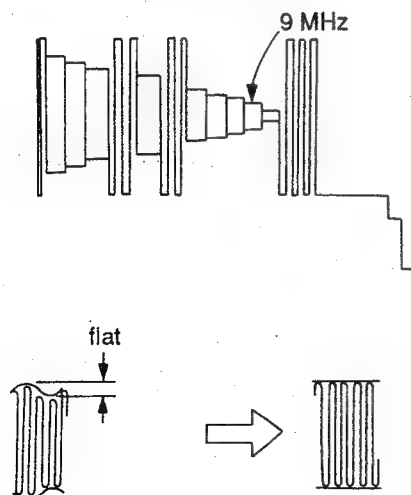
(Monitor)

- Adjustment procedures

1. • Test point : VIDEO OUT Terminal
• Adj. point : ●RV13 (DTL ALIAS) / IE-30AP
• Spec. : A = 100 ± 2 IRE



- 2. • Test point : VIDEO OUT Terminal
- Adj. point : **RV13 (DTL ALIAS) / IE-30AP**
- Spec. : Adjust so that the 9MHz signal of multi-burst chart becomes horizontally flat.



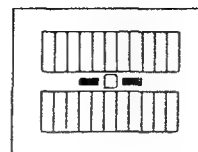
7-5-9. Crispening adjustment

• Setting

Equipment: Waveform monitor	Board: IE-30AP board
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• Preparation

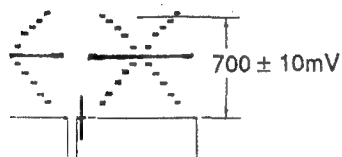
- To be extended; IE-30AP board
- S1 (DTL ON/OFF) switch / IE-30AP board : ON
- RV8 (LEV DEP) / IE-30AP board → fully counterclock wise
- RV7 (H/V RATIO) / IE-30AP board → fully counterclock wise
- Shoot the gray scal chart in full underscan's picture frame by zooming a lens.



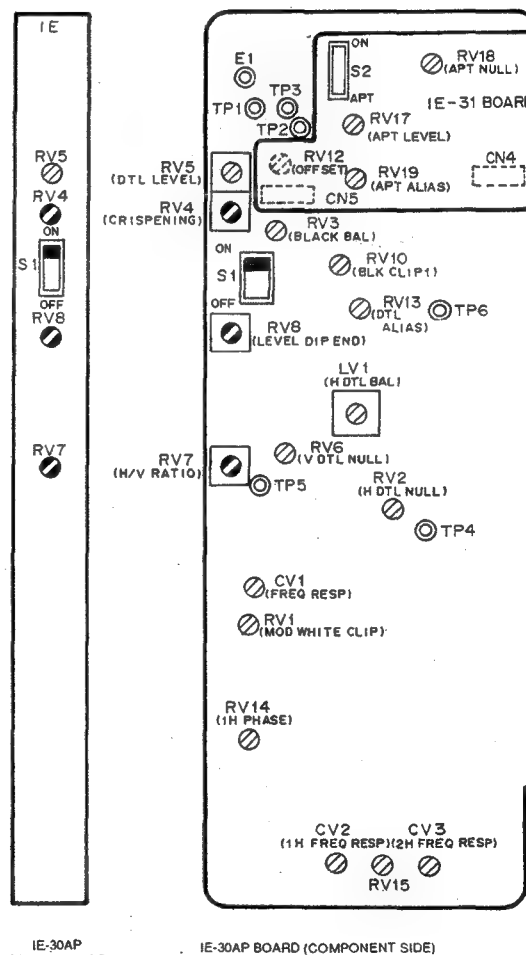
(Monitor)

• Adjustment procedures

1. • Test point : VIDEO OUT Terminal
• Adj. point : IRIS CONTROL
• Spec. : $700 \pm 10\text{mV}$ (WHITE LEVEL)



2. • Test point : VIDEO OUT Terminal
• Adj. point : RV4 (CLISP) / IE-30AP board
• Spec. : Noise of the output waveform on the waveform monitor start to be reduced.



IE-30AP (PANEL SIDE)

IE-30AP BOARD (COMPONENT SIDE)

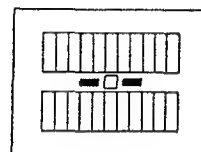
7-5-10. Level Dependent Adjustment

• Setting

Equipment: Waveform Monitor	Board: IE-30AP board
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• Preparation

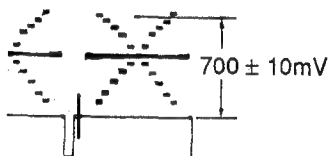
- To be extended; IE-30AP board
- S3 (Y/G SELECT) / EN-79P: G
- S1 (DTL ON/OFF) / IE-30AP: ON
- Shoot the gray scale chart in full underscan's picture frame by zooming a lens.



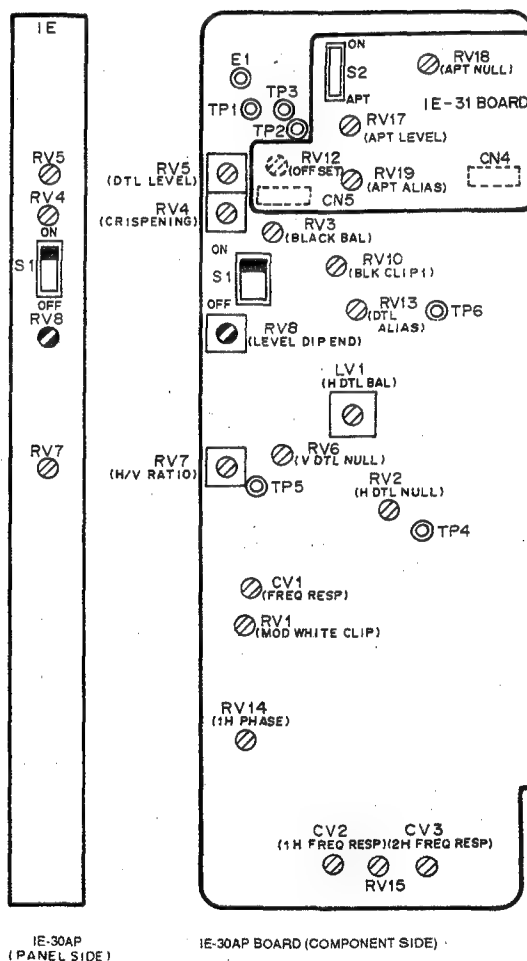
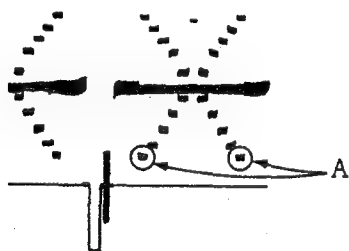
(Monitor)

• Adjustment procedures

1. • Test point : VIDEO OUT Terminal
• Adj. point : IRIS CONTROL
• Spec. : $700 \pm 10\text{mV}$ (WHITE LEVEL)



2. • Test point : Waveform Monitor
• Adj. point : RV8 (LEVEL DEPEND) / IE-30AP
• Spec. : The detail signal should not be added to portion A.



IE-30AP
(PANEL SIDE)

IE-30AP BOARD (COMPONENT SIDE)

• Note

- After adjustment is completed, perform the 7-5-12 H/V RATIO, Detail Level Adjustment.

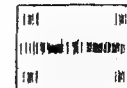
7-5-11. Aperture Adjustment

• Setting

Equipment: Waveform monitor	Board: IE-30AP board
-----------------------------	----------------------

• Preparation

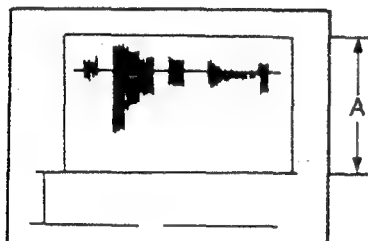
- To be extended; IE-30AP board
- S1 (DTL ON/OFF) / IE-30AP : OFF
- S2 (APERTURE) / IE-30AP : ON
- Shoot the multi-burst chart using a zoom lens.



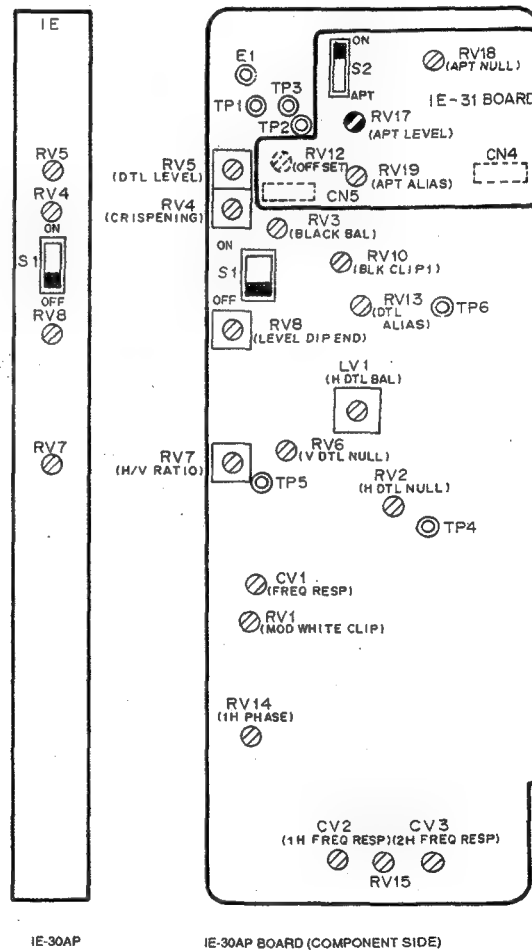
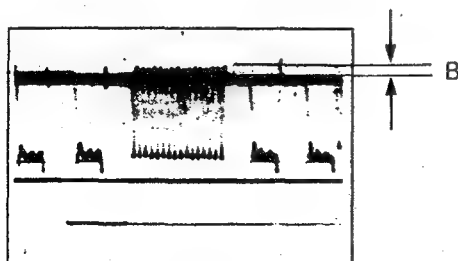
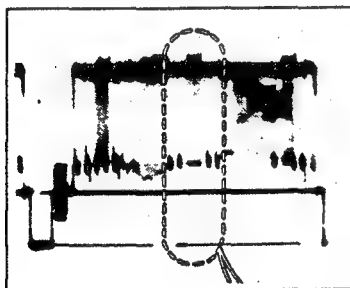
(Monitor)

• Adjustment procedures

- Test point : VIDEO OUT Terminal
- Adj. point : IRIS CONTROL
- Spec. : $A = 640 \pm 10 \text{ mV}$



- Test point : VIDEO OUT Terminal
- Adj. point : RV17 (APT LEVEL) / IE-31P
- Spec. : $B = 0$



7-5-12. H/V Ratio, Detail Level Adjustment

• Setting

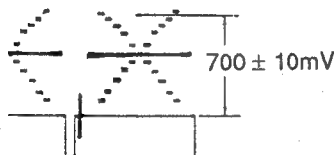
Equipment: Waveform Monitor	Board: IE-30AP board
-----------------------------	----------------------

• Preparation

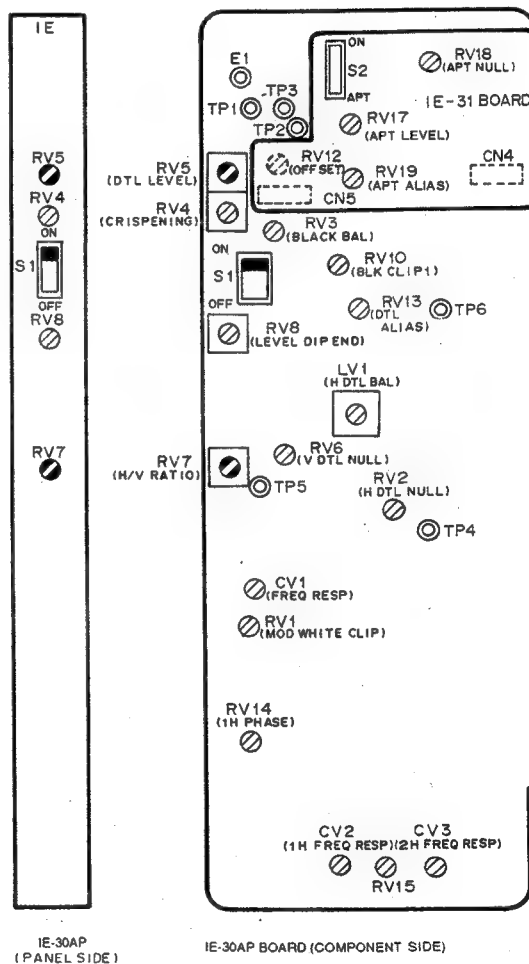
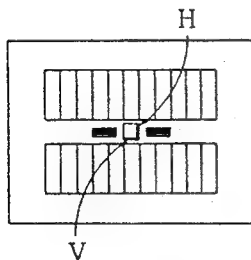
- To be extended; IE-30AP board
- S3 (Y/G SELECT)/EN-79P: ENC
- S1 (DTL ON/OFF)/IE-30AP: ON
- RV5 (DTL LEVEL)/IE-30AP: Fully turn clockwise.
- Shoot the gray scale chart in full underscan's picture frame by zooming a lens.

• Adjustment procedures

- Test point : VIDEO OUT Terminal
- Adj. point : IRIS CONTROL
- Spec. : $700 \pm 10\text{mV}$ (WHITE LEVEL)



- Test point : Monitor
- Adj. point :
 - RV7 (H/V RATIO) / IE-30AP
 - RV5 (DTL LEVEL) / IE-30AP
- Spec. : The ratio of the detail signals which are added in the horizontal and vertical directions should be the same. Set the detail level according to the user's request by adjusting.



7-5-13. V Detail Black Clip Adjustment

• Setting

Equipment: Waveform Monitor

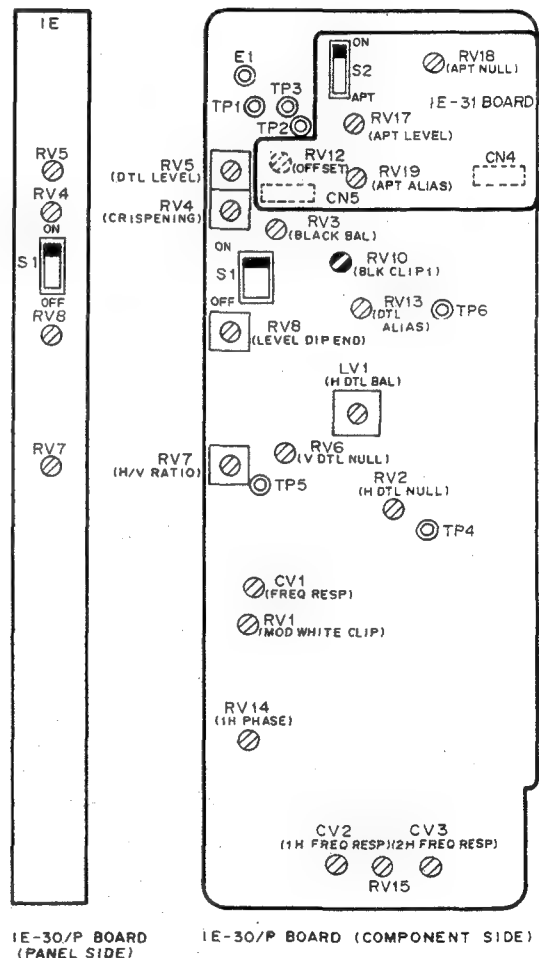
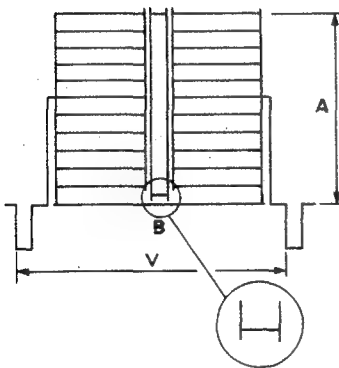
Board: IE-30P board

• Preparation

- To be extended; IE-30P board
- S2 (APT ON/OFF)/IE-31: ON
- S1 (DTL ON/OFF)/IE-30P: ON
- Waveform monitor: HORIZONTAL → FIELD (V)
- Shoot the gray scale chart in full underscan's picture frame by zooming a lens.

• Adjustment procedures

- Test point : VIDEO OUT Terminal
• Adj. point : Iris control
• Spec. : 630 ± 14 mV
- Test point : VIDEO OUT Terminal
• Adj. point : RV10 (BLK CLIP1)/IE-30P
• Spec. : From the position where the volume is fully turned counterclockwise, turn it clockwise until spikes in area "B" are clipped, and then return it a little.



7-5-14. Streaking Adjustment

BOARD CHANGE INFORMATION

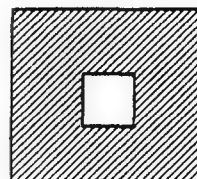
OLD NAME	→	NEW NAME	SERIAL NUMBER
PA-101	→	PA-155	44001 and higher

• Setting

Equipment:	Board: PA-101/155 board
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• Preparation

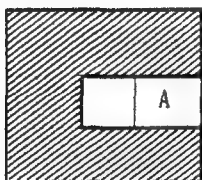
- Shoot the white window chart using a zoom lens.
- Set the iris control to F5. 6-4.
- GAIN selector (side panel): 18



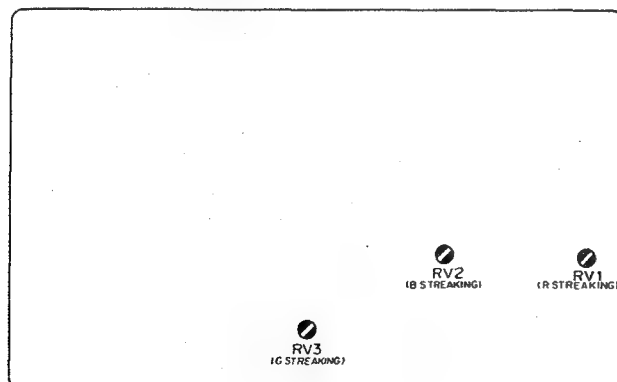
(Monitor)

• Adjustment procedures

- Test point : Color Monitor
- Adj. point :
 - RV1 (R STREAKING)/PA-101
 - RV2 (B STREAKING)/PA-101
 - RV3 (G STREAKING)/PA-101
 - RV6 (R STREAKING)/PA-155
 - RV4 (B STREAKING)/PA-155
 - RV5 (G STREAKING)/PA-155
- Spec. : Streaking at portion A should be decrease.

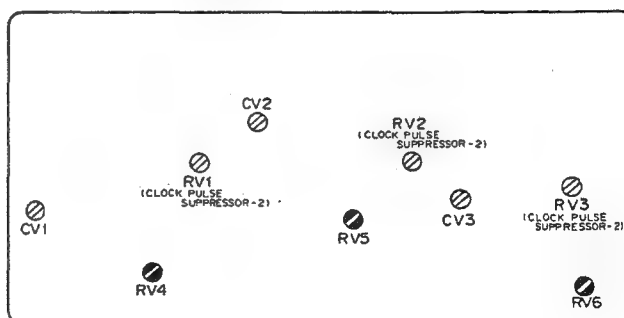


(NOTE) Not fix the RV1, 2 and 3 at the fully counterclockwise.



PA-101 BOARD (SOLDERING SIDE)

(NOTE) Not fix the RV4, 5 and 6 at the fully counterclockwise.



PA-155 BOARD (SOLDERING SIDE)

7-6. AUTO CONTROL SYSTEM ADJUSTMENT

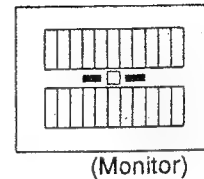
7-6-1. Auto Iris Adjustment

• Setting

Equipment: Waveform Monitor	Board: SG-152P board
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• Preparation

- Iris AUTO/MANU (lens) sw: AUTO
- OUTPUT/DCC sw (side panel): CAM/ON
- Shoot the gray scale chart in full underscan's picture frame by zooming a lens.

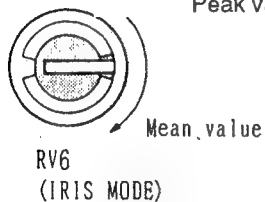


• Adjustment procedures

- Test point : VIDEO OUT Terminal

• Adj. point : ● RV6 (IRIS MODE)/ SG-152P

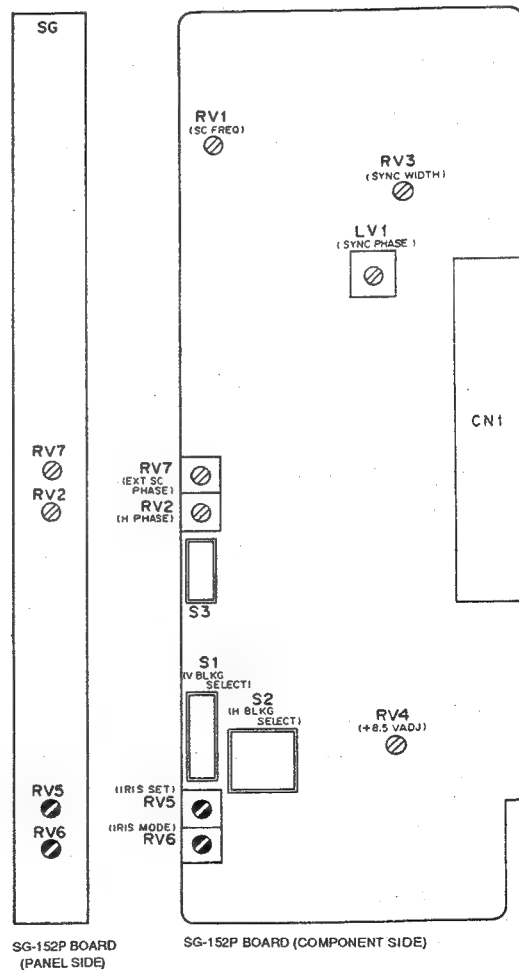
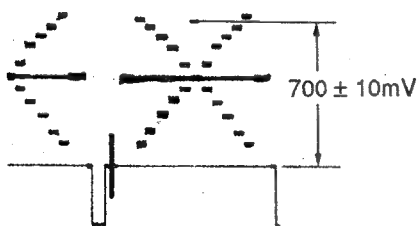
• Spec. : Using RV6 (IRIS MODE) on the SG-152P board, the auto iris mode can be set between the video signal's mean value-based operation (fully turned clockwise) and peak value-based operation (fully turned counterclockwise). The mode can be set as required. RV6 is usually set to the center position.



- Test point : VIDEO OUT Terminal

• Adj. point : ● RV5 (IRIS SET)/ SG-152P

• Spec. : $700 \pm 10\text{mV}$ (WHITE LEVEL)



• Note

- After adjustment is completed, set the iris (AUTO/MANU) (lens) switch to MANU.

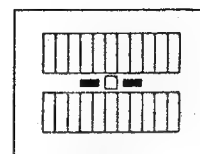
7-6-2. Low Video Adjustment

• Setting

Equipment: Waveform Monitor	Board: AT-49A board
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• Preparation

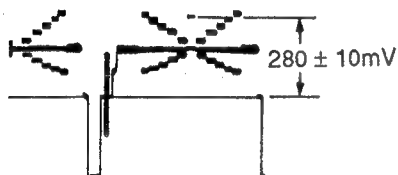
- S3 (Y/G SELECT)/ EN-79P: ENC
- Shoot the gray scale chart in full underscan's picture frame by zooming a lens.



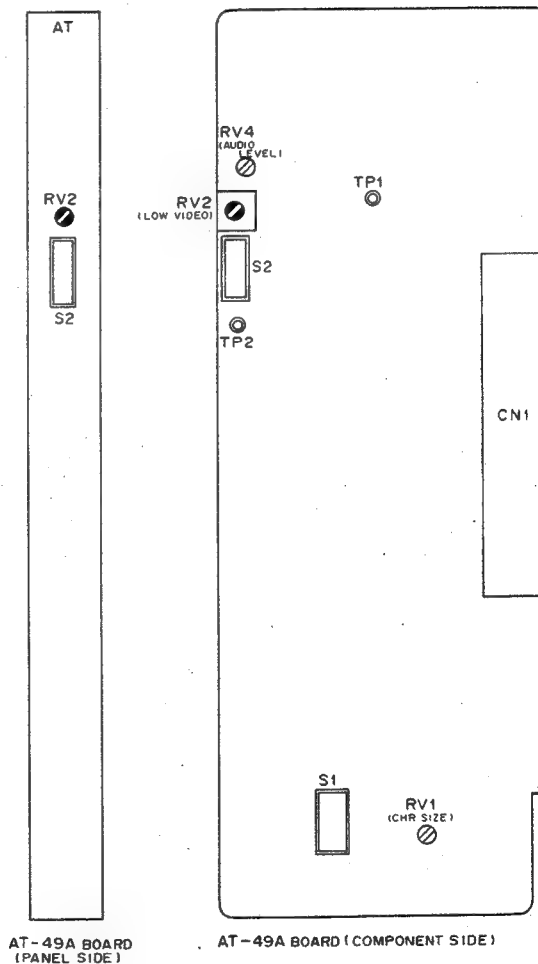
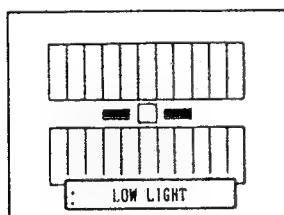
(Monitor)

• Adjustment procedures

- Test point : VIDEO OUT Terminal
 - Adj. point : IRIS CONTROL
 - Spec. : $280 \pm 10\text{mV}$ (White level)



- Test point : Viewfinder
 - Adj. point : ● RV2 (LOW VIDEO)/AT-49A
 - Spec. : Turn ● RV2 (LOW VIDEO) on the AT-49A board from fully counterclockwise to clockwise so that "LOW LIGHT" appears on the viewfinder.



AT-49A BOARD
(PANEL SIDE)

AT-49A BOARD (COMPONENT SIDE)

7-6-3. Character Size Adjustment

• Setting

Equipment:	Board: AT-49A/49C board
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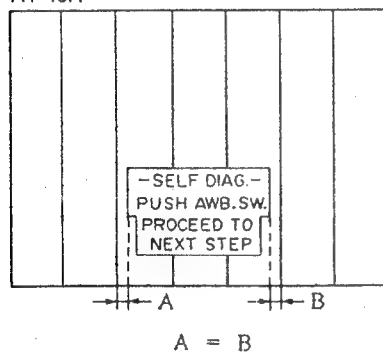
• Preparation

- OUTPUT/DCC sw (side panel): BARS/OFF
- S1-2 (CHECK) / AT-49A: ON (AT-49A)
- SHUTTER sw (front panel): ON } (AT-49C)
- SHUTTER SPEED: 1/2000

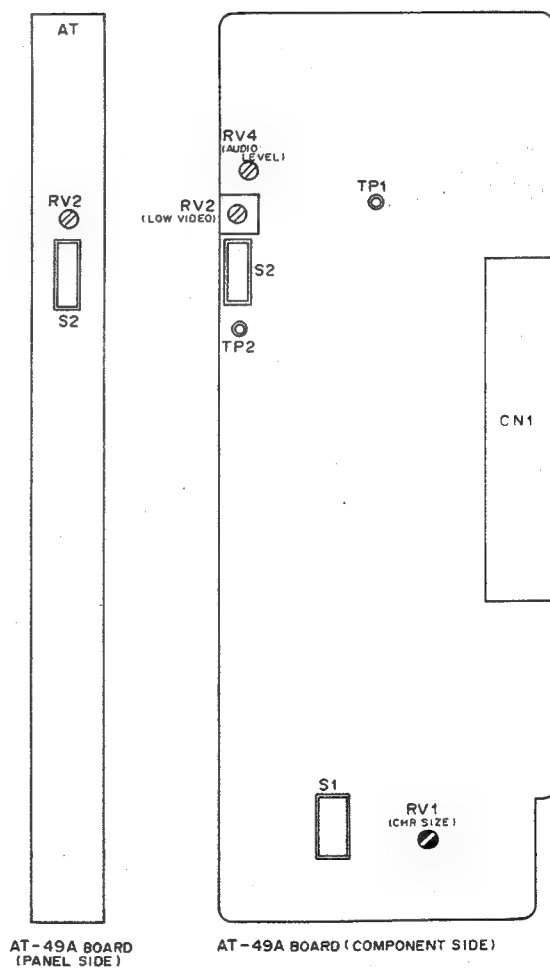
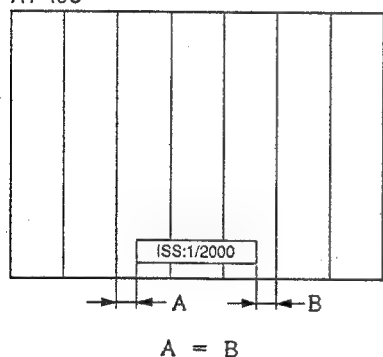
• Adjustment procedures

- Test point : Viewfinder
- Adj. point : ● RV1 (CHR SIZE)/AT-49A
- Spec. : Adjust so that the characters on the viewfinder are displayed in the center.

AT-49A



AT-49C



• Note

- After adjustment is completed, set the switches as follows.
 OUTPUT/DCC sw (side panel) : CAM/OFF
 S1-2 (CHECK)/AT-49A : OFF (AT-49A)
 SHUTTER sw (front panel) : OFF (AT-49C)

7-6-4. Audio Level Adjustment




• Setting

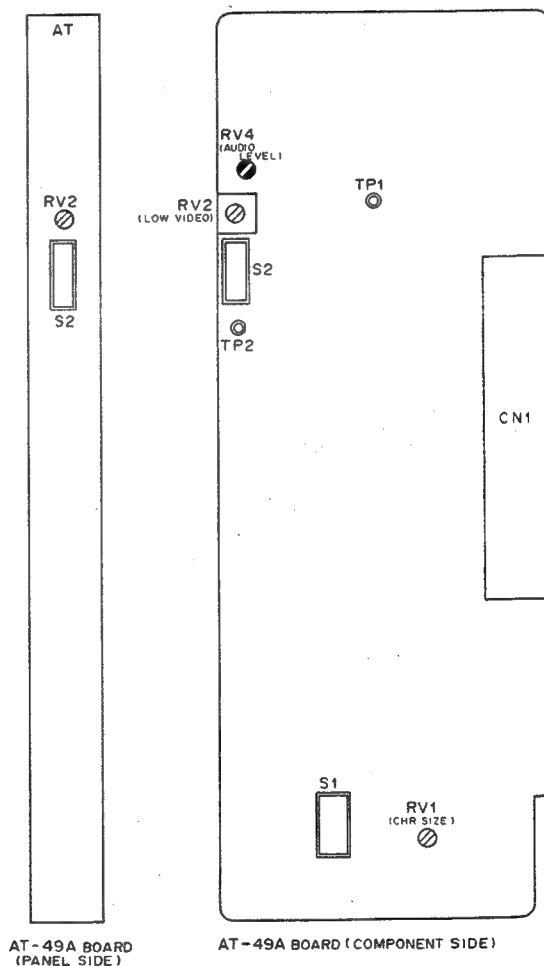
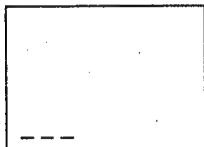
Equipment: Dualtrace Oscilloscope	Board: AT-49A board
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• Preparation

- To be extended; AT-49A board
- Set the AUDIO IN switch of the viewfinder to ON.
- Supply a 1kHz sine wave signal (0 dBu) to the AUDIO IN CH-1 terminal.
- AUDIO SELECT CH-1 sw (side panel): MAN
- AUDIO IN sw (side panel): LINE

• Adjustment procedures

- Test point : TP13/Extension board
 - Adj. point :  AUDIO LEVEL CH-1 control (side panel)
 - Spec. : 0.7 Vp-p
- Test point : Viewfinder
 - Adj. point :  RV4 (AUDIO LEVEL) /AT-49A
 - SPEC. : Gradually turn  RV4 (AUDIO LEVEL) on the AT-49A board from fully clockwise to counterclockwise so that the third "-" (from the left) appears on the viewfinder.



• Note

- After adjustment is completed, insert the AT-49A board.

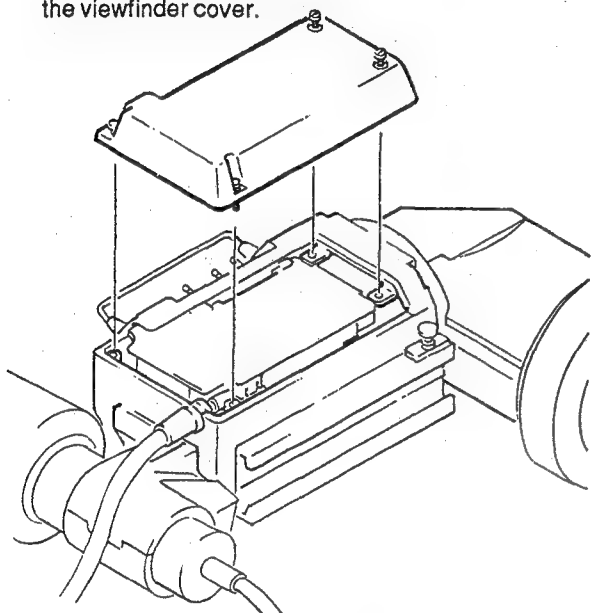
BOARD CHANGE INFORMATION

OLD NAME	→	NEW NAME	SERIAL NUMBER
VIEWFINDER			44001 and higher
VF-32		VF-50	
LP-58		LP-64	
LP-40	→	LP-65	
LP-42		LP-66	
VR-67		VR-149	
SW-260A		SW-562	
		CN-771(added)	

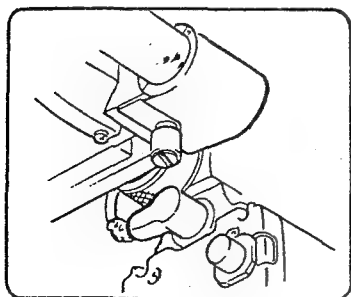
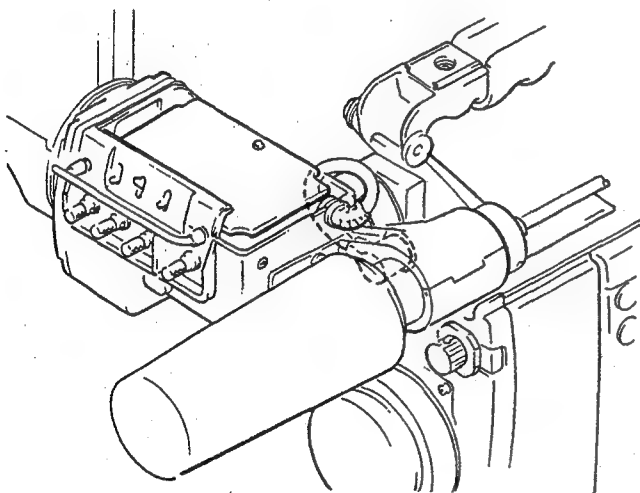
7-7. VIEWFINDER SYSTEM ADJUSTMENT

This adjustment should be performed after the camera is adjusted completely.

1. Turn OFF The main POWER switch (side panel) before adjustment.
2. Remove the viewfinder from the camera, then remove the viewfinder cover.

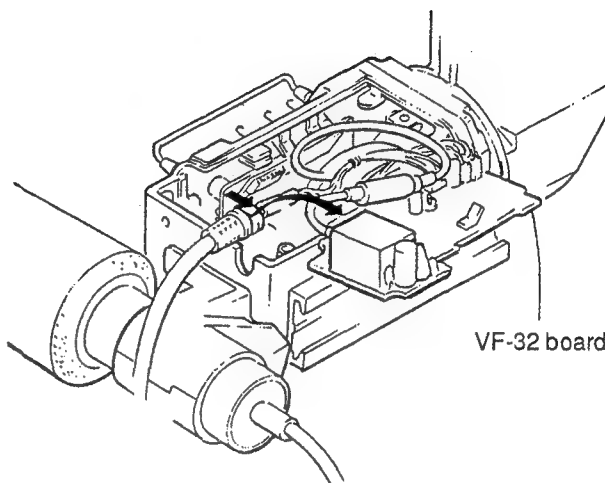


3. Turn the viewfinder upside down and install it.



BVW-300AP (EK)

4. As illustrated below, open the VF-32 board while moving it in the direction of the arrows and open the board so that the component side is placed to the upper position.



VF-32 board

5. Set the main POWER switch to ON.

7-7-1. Vertical Hold Adjustment

• Setting

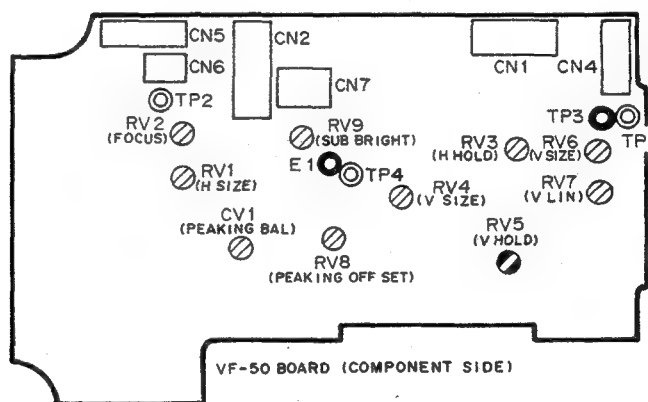
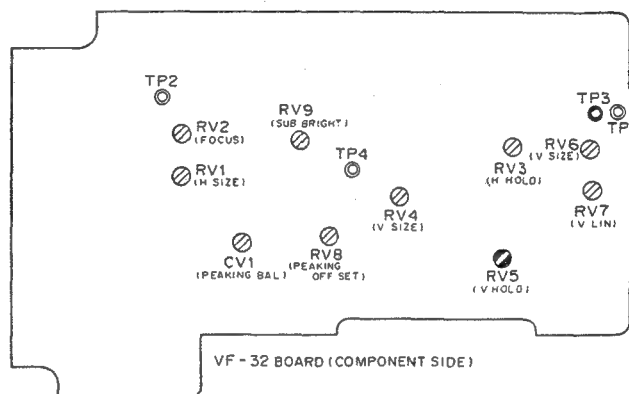
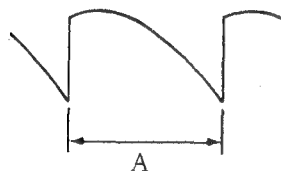
Equipment: Dualtrace Oscilloscope	Board: VF-32/50 board
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• Preparation

- Extract the EN-79P board from the unit.
- RV6 (V SIZE)/VF-32: mechanical center
(When RV6 is marked, it should not be turned.)

• Adjustment procedures

- Test point : TP3/VF-32
GND E1/VF-32
- Adj. point : ● RV5/VF-32
(V HOLD)
- Spec. : $A = 25.6 \pm 0.5\text{ms}$



• Note

- After adjustment is completed, install the EN-79P board to the unit.

7-7-2. Horizontal Hold Adjustment

- Setting

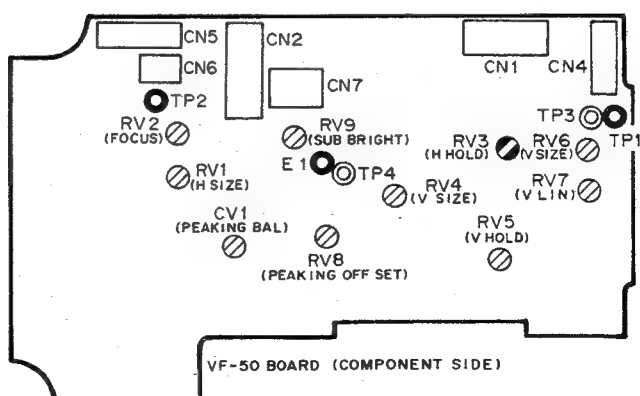
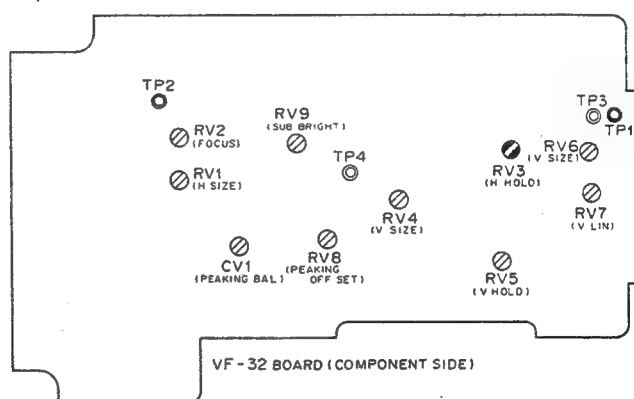
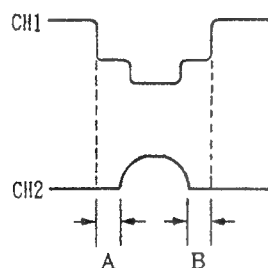
Equipment: Dualtrace Oscilloscope	Board: VF-32/50 board
-----------------------------------	-----------------------

- Preparation

- Shoot the 100% white picture frame and set the white level to 700 ± 10 mV.

- Adjustment procedures

- Test point : CH-1. TP2/VF-32
GND E1
CH-2. TP1/VF-32
GND E1
- Adj. point : ● RV3 (H HOLD) /VF-32
- Spec. : A = B



7-7-3. Bright Set Adjustment

• Setting

Equipment:	Board: VF-32/50 board
------------	-----------------------

• Preparation

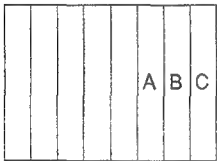
• OUTPUT/DCC switch (side panel) :	BARS/OFF.
• BRIGHT control (viewfinder) :	Fully turn counter clockwise. ⚙
• CONTRAST control (viewfinder) :	Fully turn clockwise. ⚙

• Adjustment procedures

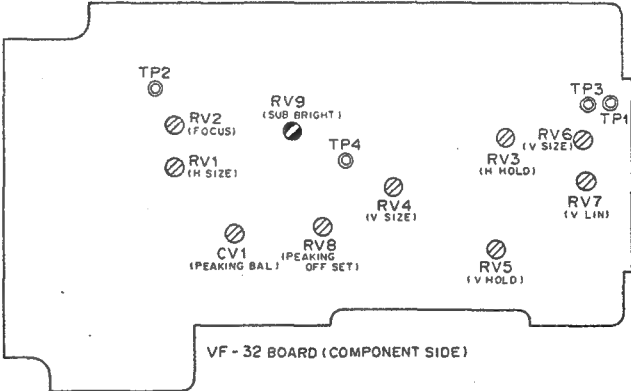
• Test point : Viewfinder

• Adj. point : ⚙ RV9/VF-32
(SUB BRIGHT)

• Spec. : Adjust ⚙ RV9/VF-32 so that portions A and B on the viewfinder screen can be barely discriminated. And portions B and C cannot be discriminated.



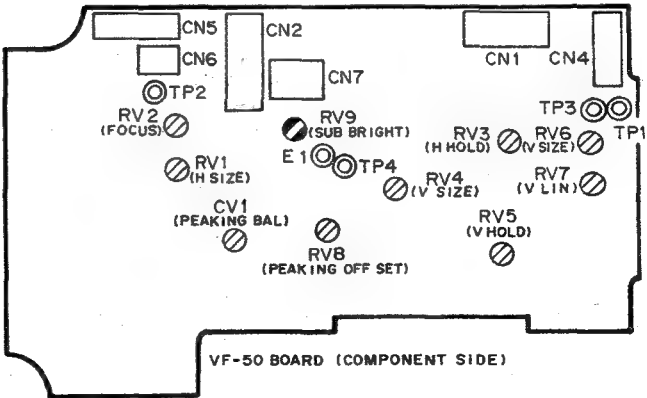
The diagram shows a rectangular viewfinder screen with vertical lines. The lines are grouped into three sections labeled A, B, and C from left to right. Section A contains 4 lines, B contains 4 lines, and C contains 4 lines.



VF - 32 BOARD (COMPONENT SIDE)

This diagram shows the component side of the VF-32 board. It includes various adjustment points and test points labeled as follows:

- TP2
- RV2 (FOCUS)
- RV1 (H SIZE)
- RV9 (SUB BRIGHT)
- TP4
- RV4 (V SIZE)
- RV3 (H HOLD)
- RV6 (V SIZE)
- RV7 (V LIN)
- RV5 (V HOLD)
- RV8 (PEAKING OFF SET)
- CV1 (PEAKING BAL)
- TP3
- TP1



VF-50 BOARD (COMPONENT SIDE)

This diagram shows the component side of the VF-50 board. It includes various adjustment points and test points labeled as follows:

- CN5
- CN6
- CN2
- CN7
- CN1
- CN4
- TP2
- RV2 (FOCUS)
- RV1 (H SIZE)
- RV9 (SUB BRIGHT)
- TP4
- RV4 (V SIZE)
- RV3 (H HOLD)
- RV6 (V SIZE)
- RV7 (V LIN)
- RV5 (V HOLD)
- RV8 (PEAKING OFF SET)
- CV1 (PEAKING BAL)
- TP3
- TP1
- E 1

7-7-4. Peaking Balance Adjustment

• Setting

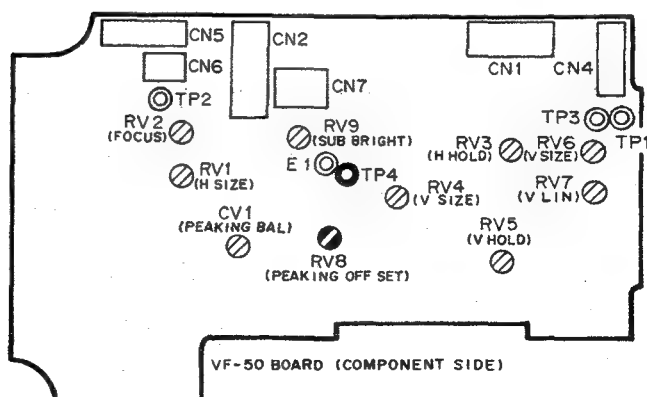
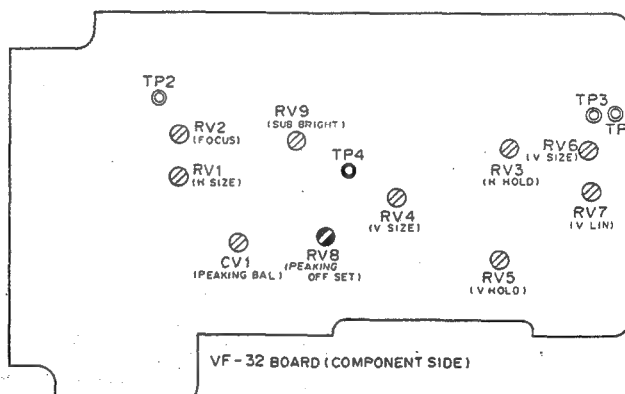
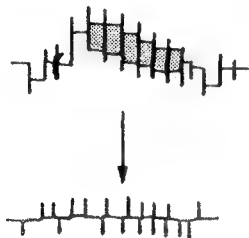
Equipment: Dualtrace Oscilloscope	Board: VF-32/50 board
-----------------------------------	-----------------------

• Preparation

• OUTPUT/DCC switch (side panel) : BARS/OFF

• Adjustment procedures

- Test point : TP4/VF-32
- Adj. point : ● RV8 /VF-32
(PEAKING OFFSET)
- Spec. : Only spike noises should appear at TP4.



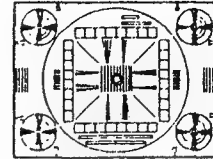
7-7-5. Focus Adjustment

• Setting

Equipment:	Board: VF-32/50 board
------------	-----------------------

• Preparation

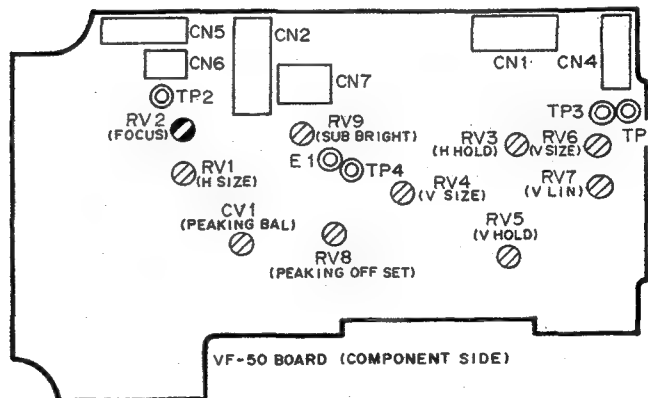
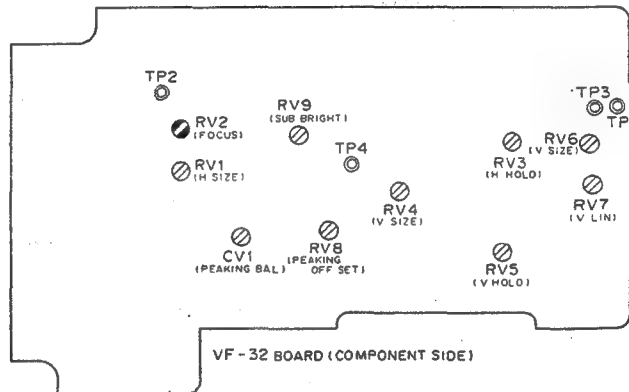
- Shoot the resolution chart in a full picture frame.
- Adjust the iris control so that the output level at the VIDEO OUT terminal is 490 ± 10 mV.
- Adjust so that the LENS FOCUS is set to the best focusing point on the black and white monitor.
- BRIGHT and CONTRAST controls of the viewfinder: mechanical center.



(Viewfinder)

• Adjustment procedures

- Test point : Viewfinder
- Adj. point : ● RV2/VF-32 (FOCUS)
- Spec. : Gradually turn ● RV2 (FOCUS) on the VF-32 board from fully counterclockwise to clockwise so that the focus is best. (RV should be turned slowly.)



• Note

- After adjustment is completed, check that the focus operation can be performed irrespective of its BRIGHT and CONTRAST controls setting.

7-7-6. Picture Frame Adjustment

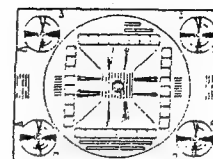
Step 1.

• Setting

Equipment:	Board: VF-32/50 board
------------	-----------------------

• Preparation

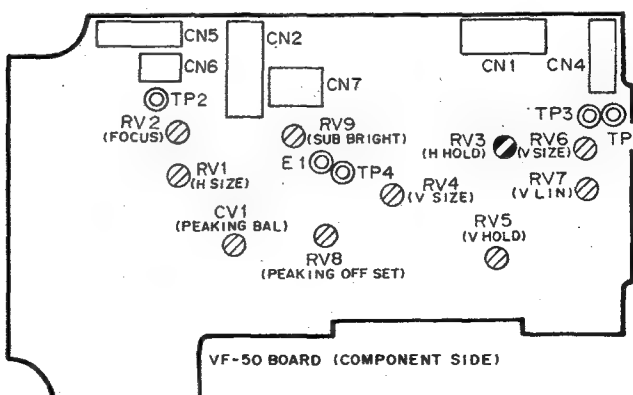
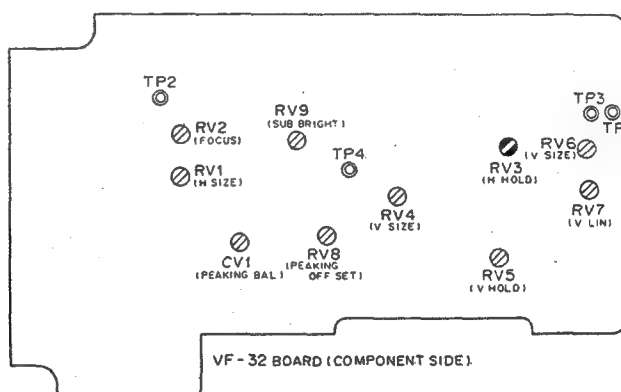
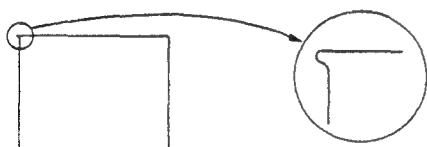
- BRIGHT control (viewfinder) : mechanical center.
- CONTRAST control (viewfinder) : mechanical center.
- PEAKING control (viewfinder) : mechanical center.
- Shoot the resolution chart in a full underscan's picture frame by zooming a lens.



(Monitor)

• Adjustment procedures

- Test point : Viewfinder
- Adj. point : ● RV3/VF-32
- Spec. : If the upper left corner of the picture is distorted, make right angle.



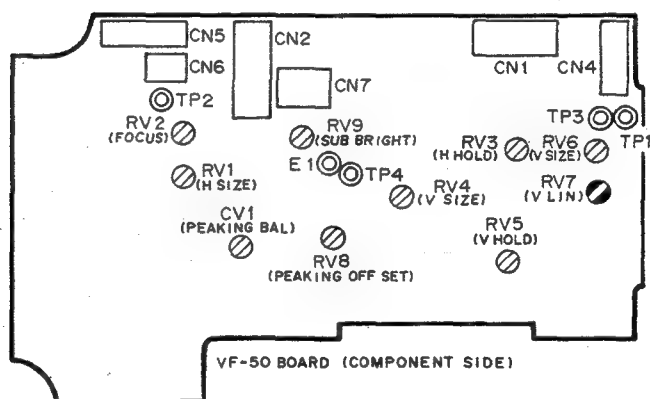
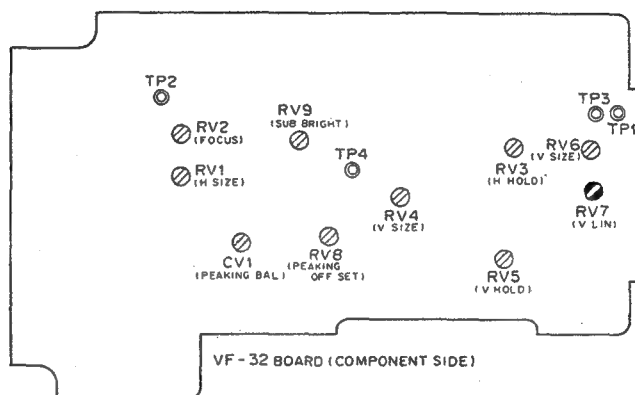
Step 2.

• Setting

Equipment:	Board: VF-32/50 board
------------	-----------------------

• Adjustment procedures

- Test point : Viewfinder
- Adj. point : ● RV7 /VF-32
(V LIN)
- Spec. : Minimize the distortion of the four circles at the four corners of the resolution chart.



Step 3.

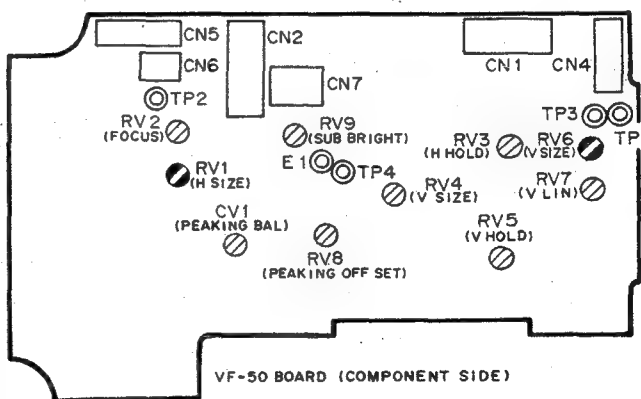
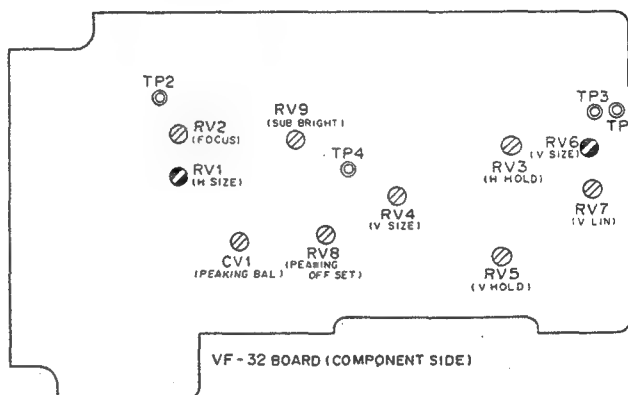
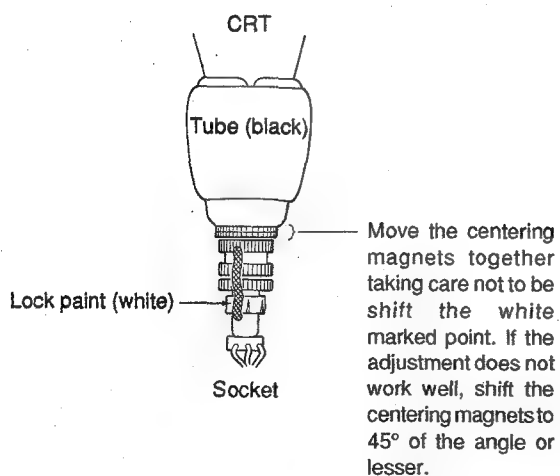
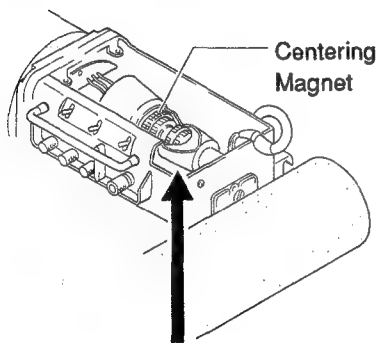
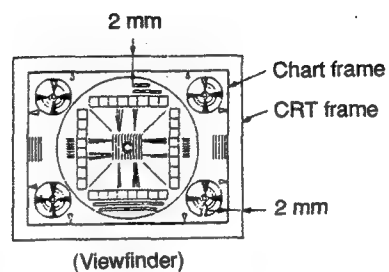
• Setting

Equipment:	Board: VF-32/50 board
------------	-----------------------

• Adjustment procedures

- Test point : Viewfinder
- Adj. point :
 - RV1/VF-32 (H SIZE)
 - RV6/VF-32 (V SIZE)
 - Centering magnet
- Spec. : Adjust ● RV1 (H SIZE) and ● RV6 (V SIZE) so that the resolution chart is as shown below.
Turn the centering magnet only when the left and upper corners cannot be adjusted.

(NOTE) When the paint-locked centering magnet is turned, paint-lock it again.



• Note

- After adjustment is completed, close the VF-32 board.
Check that the picture is in the center of the viewfinder in the normal installing position on the unit.

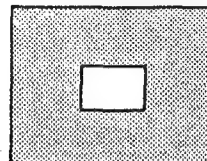
7-7-7. Peaking Level Adjustment

• Setting

Equipment:	Board: VF-32/50 board
------------	-----------------------

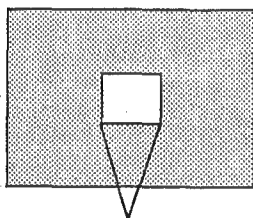
• Preparation

- Shoot the white window chart and adjust the iris control so that the white peak level at the VIDEO OUT terminal is 350 ± 10 mV.
- BRIGHT and CONTRAST controls of the viewfinder: mechanical center.
- Turn the PEAKING control (of the viewfinder) from fully clockwise to counterclockwise by 10 degrees.

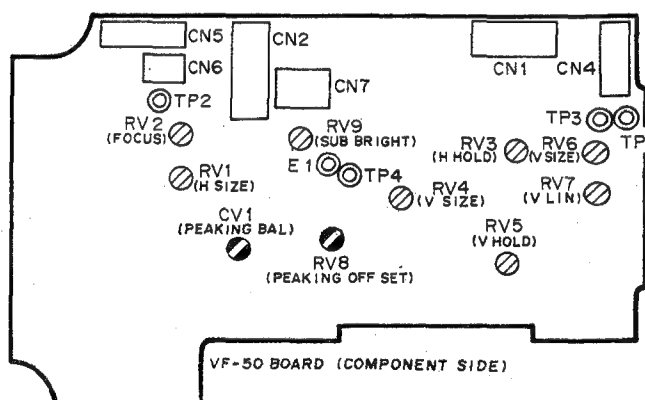
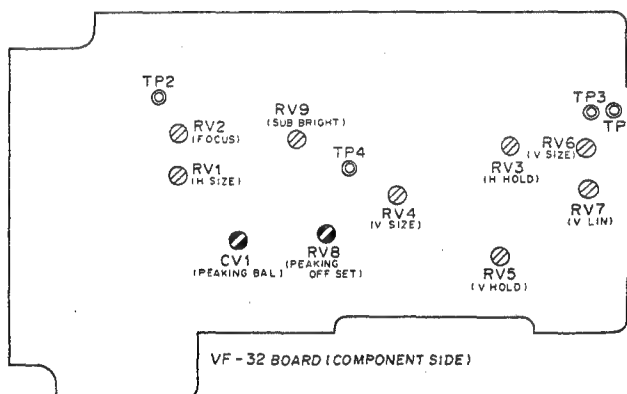


• Adjustment procedures

- Test point : Viewfinder
- Adj. point : ● CV1 /VF-32 (PEAKING BAL)
● RV8 /VF-32 (PEAKING OFFSET)
- Spec. : Adjust the CV1 /VF-32 and RV8 /VF-32 so that the peak level at edges are the same.



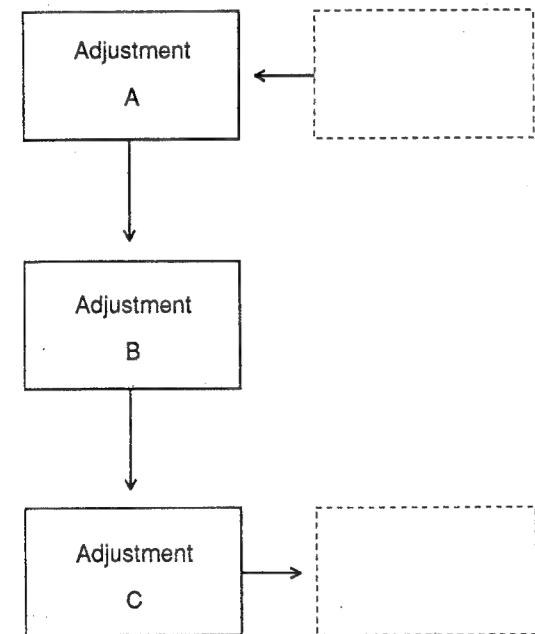
The peak level at edges should be the same.



Before this adjustment, set the switches referring to the Sec. 7-1-2 Connection and Initial Setting.

7-8-1. Partial Adjustment of Video Signal System

The relation between respective adjustments of the video signal system is shown in Fig. 7-1. Perform the adjustments as described below.



- When adjustment B is performed:
- ① Check that Adjustment A satisfies the specification.
(When the specification is not satisfied, readjust it.)
 - ② Perform adjustment B.
 - ③ Check that adjustment C satisfies the specification.
If the specification is not satisfied, readjust it.

BOARD CHANGE INFORMATION		
OLD NAME	→ NEW NAME	SERIAL NUMBER
VA-83	→ VA-168	44001 and higher

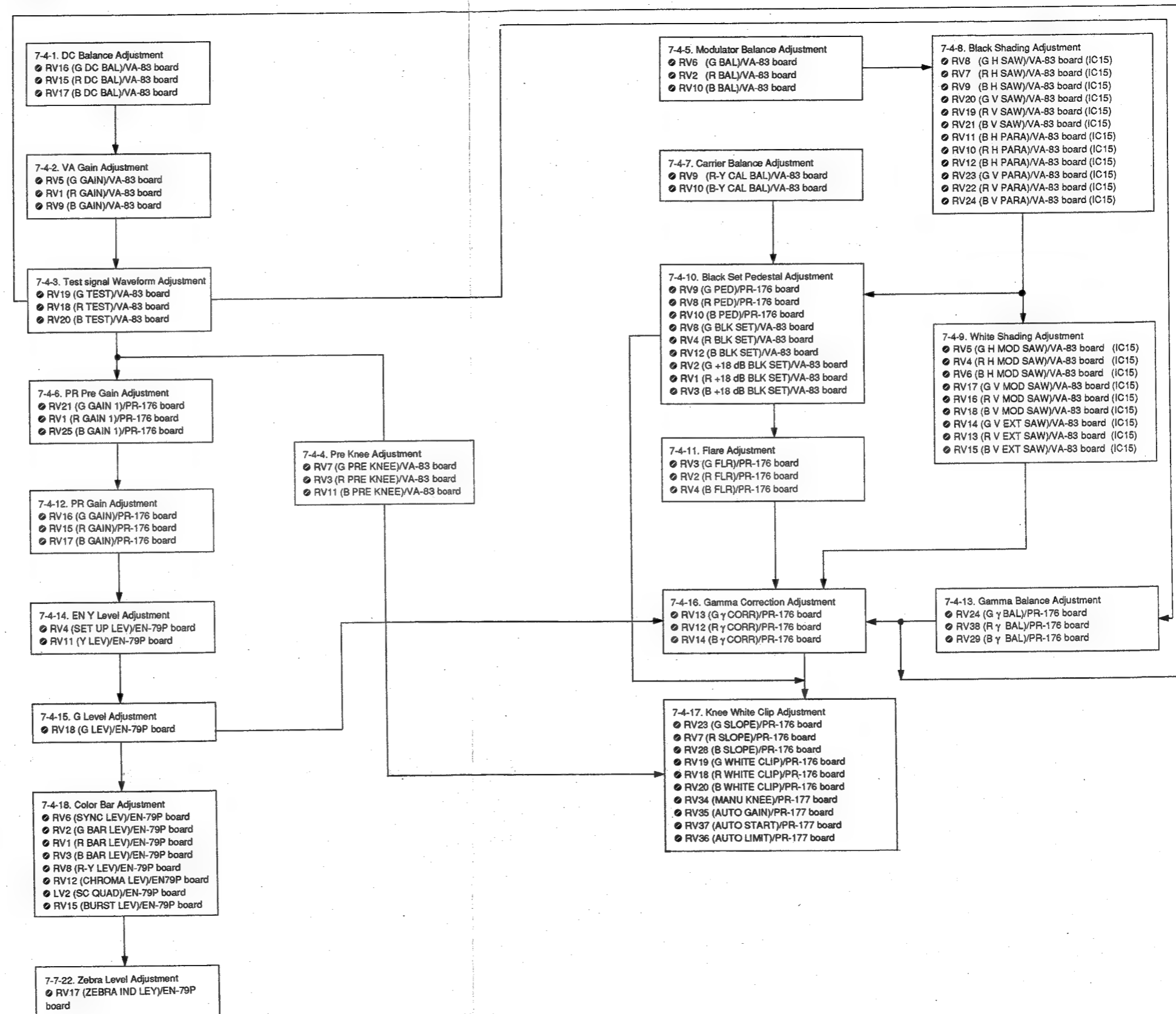


Fig. 7-1

SECTION 8 VTR SYSTEM ALIGNMENT

8-1. PRECAUTIONS ON ADJUSTMENTS

- **Boards Extension**

When the boards are extended, be sure to turn the POWER switch to OFF position.

8 VTR SYSTEM ALIGNMENT ■■■■■■

8-2. POWER AND SYSTEM CONTROL ADJUSTMENT

【Equipment】

- Variable DC Power Supply
- Digital Voltmeter
- Blank tape BCT-20G or BCT-20M

【Switches setting on the side panel and function Panel】

Do not change the setting below unless otherwise specified.

- | | |
|---------------------------------|-------------|
| • VTR switch | : STBY |
| • GAIN selector | : 0 |
| • OUTPUT/DCC selector | : CAM/OFF |
| • WHITE BAL selector | : PRST |
| • AUDIO IN CH-1/CH-2 switch | : REAR/LINE |
| • AUDIO SELECT CH-1/CH-2 switch | : AUTO |
| • F-RUN/R-RUN switch | : R-RUN |
| • REAL TIME switch | : OFF |

8-2-1 BAT +5V Voltage Adjustment

• Setting

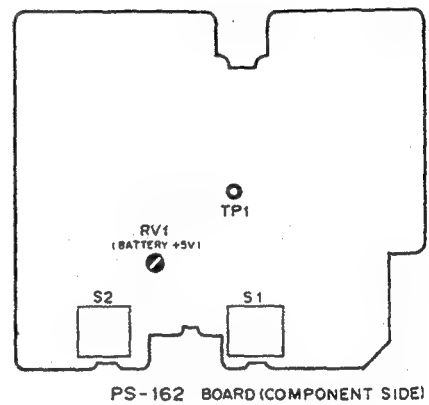
Equipment: Digital Volt Meter	Board: PS-162 board
-------------------------------	---------------------

• Preparation

<ul style="list-style-type: none">• DC IN: 12V\pm0.5Vdc• Insert a cassette tape and put the unit into the REC mode.

• Adjustment procedures

Test point : TP1/PS-162 (GND : E1/PS-162)
Adj. point : ●RV1 (+5V ADJ)/PS-162
Spec. : +5.5 \pm 0.02 Vdc



8-2-2 Battery Voltage Detection Adjustment

• Setting

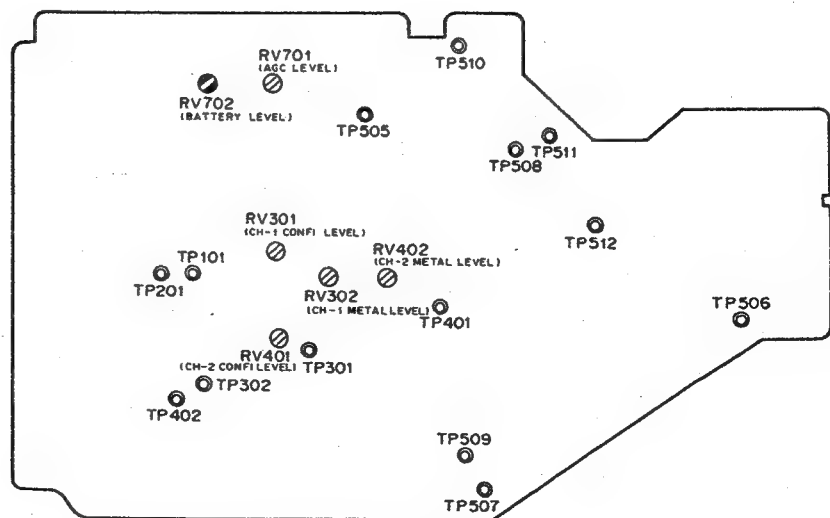
Equipment: Digital Volt Meter	Board: TC-48AP board
-------------------------------	----------------------

• Preparation

- DC IN: $11.50 \pm 0.02 \text{Vdc}$
- Insert a cassette tape and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP505/TC-48AP
GND: E501/TC-48AP
- Adj. Point : \odot RV702
(BATTERY LEVEL)/TC-48AP
- Spec. : $1.75 \pm 0.03 \text{Vdc}$



TC-48AP BOARD (SOLDERING SIDE)

8-3. SERVO SYSTEM ADJUSTMENT

【Equipment】

- Dualtrace Oscilloscope
- Blank tape BCT-20G or BCT-20M

【Switches setting on the side panel and function panel】

Do not change the setting below unless otherwise specified.

- | | |
|---------------------------------|-------------|
| • VTR switch | : STBY |
| • GAIN selector | : 0 |
| • OUTPUT/DCC selector | : CAM/OFF |
| • WHITE BAL selector | : PRST |
| • AUDIO IN CH-1/CH2 switch | : REAR/LINE |
| • AUDIO SELECT CH-1/CH-2 switch | : AUTO |
| • F-RUN/R-RUN switch | : R-RUN |
| • REAL TIME switch | : OFF |

8-3-1 Capstan FG-B Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

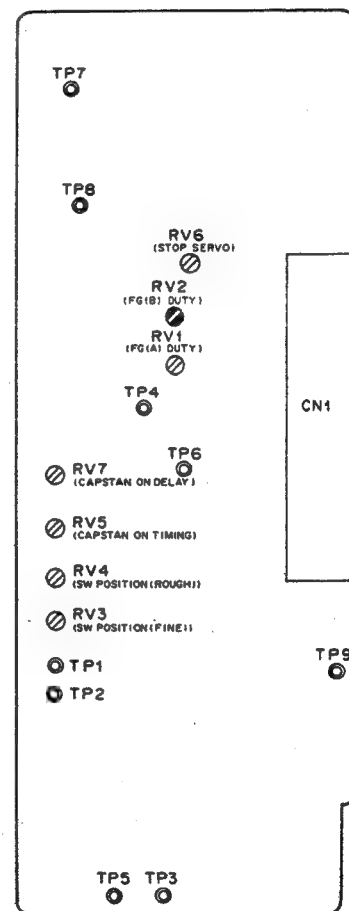
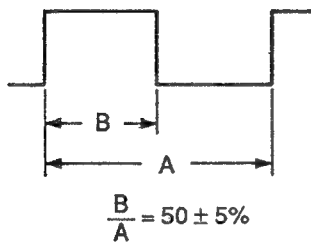
Board: SV-97AP board

• Preparation

- Insert the BCT-20M or BCT-20G and put the unit into the PLAY mode.

• Adjustment procedures

- Test point : TP27/Extension board
- Adj. point : ●RV2 (FG(B) DUTY)/SV-97AP
- Spec. : $\frac{B}{A} = 50 \pm 5\%$



SV-97AP BOARD (COMPONENT SIDE)

8-3-2 Stop Servo Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

Board: SV-97AP board

• Preparation

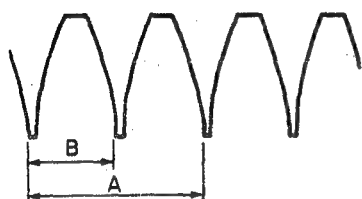
- Insert the BCT-20M or BCT-20G and put the unit into the PLAY mode.

• Adjustment procedures

1 Test point : TP4/SV-97AP

Adj. point : RV1 (FG(A)DUTY)/SV-97AP

Spec. : $\frac{B}{A} = 50 \pm 5\%$ (PLAY mode)

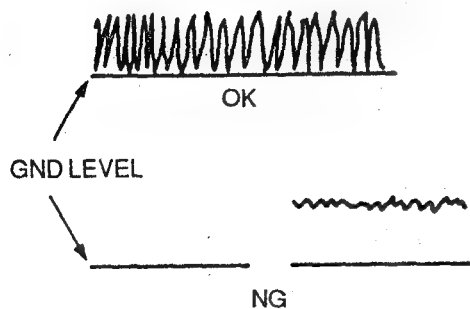


TRIG: TP27/Extension board

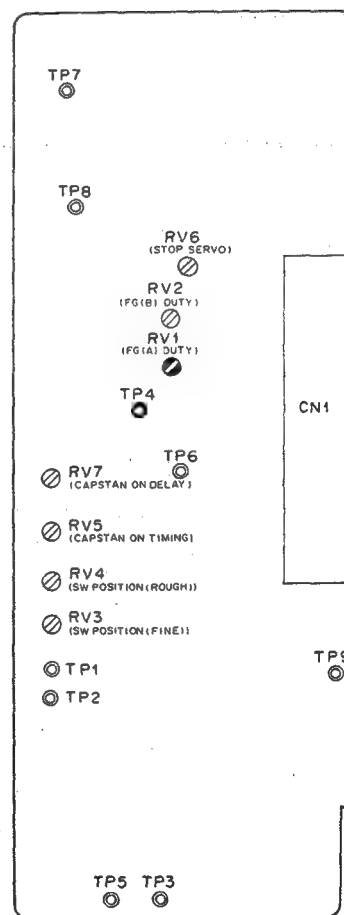
2 Test point : TP4/SV-97AP

Adj. point : RV1 (FG(A)DUTY)/SV-97AP

Spec. : (STOP mode)



TRIG: TP27/Extension board



SV-97AP BOARD (COMPONENT SIDE)

8-3-3 Composite Shooting Adjustment

• Setting

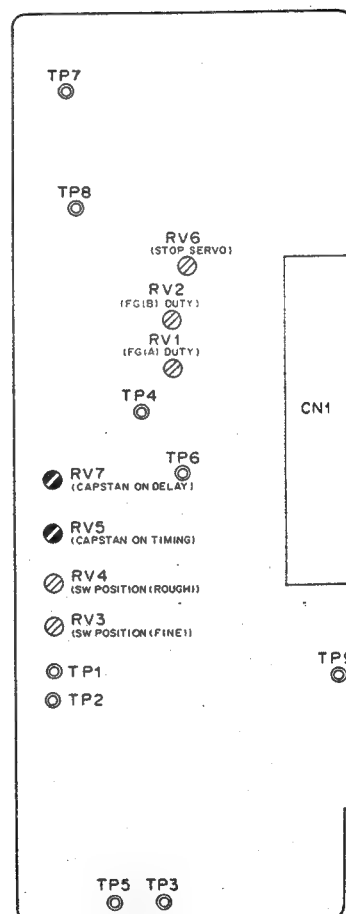
Equipment: Dualtrace Oscilloscope	Board: SV-97AP board
-----------------------------------	----------------------

• Preparation

- Insert the BCT-20M or BCT-20G.
- Connect the Servo Remote Control Tool to connector CN2 on the SV-97AP board.
- Short between TP11 and TP1 on the extension board with a shorting clip.
- Short between TP9 on the SV-97AP board and TP18 on the extension board with a shorting clip.

• Adjustment procedures

- 1 • REC SERVO switch/Servo Remote Control Tool : ON
 - Test point : TP7/Extension board
 - Spec. : Check that the signal at TP7 is set low, high, and low (for 80 seconds (max)).
- 2 • REC SERVO switch/Servo Remote Control Tool : OFF
 - Test point : TP8/Extension board
 - Adj. point : RV5 (CAPSTAN ON TIMING)/SV-97AP
 - Spec. : Adjust so that the high signal at TP8 is set low.
- 3 • Test point : TP10/Extension board
 - Adj. point : RV7 (CAPSTAN ON DELAY)/SV-97AP
 - Spec. : Adjust so that the high signal at TP10 is set low.



SV-97AP BOARD (COMPONENT SIDE)

• Note

After adjustment is completed, remove the shorting clips and set the connector to the former position.

8-4. AUDIO SYSTEM ADJUSTMENT

【Equipment】

- Low-frequency Oscillator
- Audio Noise Meter
- DC Voltmeter
- Frequency Counter
- Modulation Analyzer
- PB Adaptor: VA-500 or VA-510
- Blank tape BCT-20G or BCT-20M
- Alignment tape: CR8-1APS (8-960-098-45) : OXIDE
CR8-1BPS (8-960-096-86) : METAL

*Alignment tape: CR8-1APS

TIME min. sec	AUDIO TRACK
0:00	1KHz, 0VU
2:55	Blank
3:00	10KHz, -10VU
4:55	Blank
5:00	1KHz, -20VU
5:55	Blank
6:00	40Hz, -20VU 7KHz, -20VU 10KHz, -20VU 15KHz, -20VU
7:55	Blank
8:00	1KHz sine wave (for audio & CTL height)
10:00	

*Alignment tape: CR8-1BPS

TIME min. sec	AUDIO TRACK
0:00	1KHz, 0VU
2:55	Blank
3:00	15KHz, 0VU
4:55	Blank
5:00	1KHz, -20VU
5:55	Blank
6:00	40Hz, -20VU 7KHz, -20VU 10KHz, -20VU 15KHz, -20VU
7:55	

【Switches setting on the side panel】

Do not change the setting below unless otherwise specified.

- AUDIO SELECT CH-1/CH-2 switch : AUTO
- MONITOR switch : PB
- MONITOR SELECT switch : MIX
- AUDIO IN switch : LINE
- DOLBY NR switch : OFF

【Note】

- 0dBu=0.775Vrms
- Put the Audio Noise Meter into rms mode.
- "WEIGHTING" in the specifications column shows WEIGHTING mode of the audio Noise Meter.
DIN AUDIO: 22Hz to 22kHz BPF

8-4-1 Level Volume Reference Position Adjustment

• Setting

Equipment: Audio Noise Meter

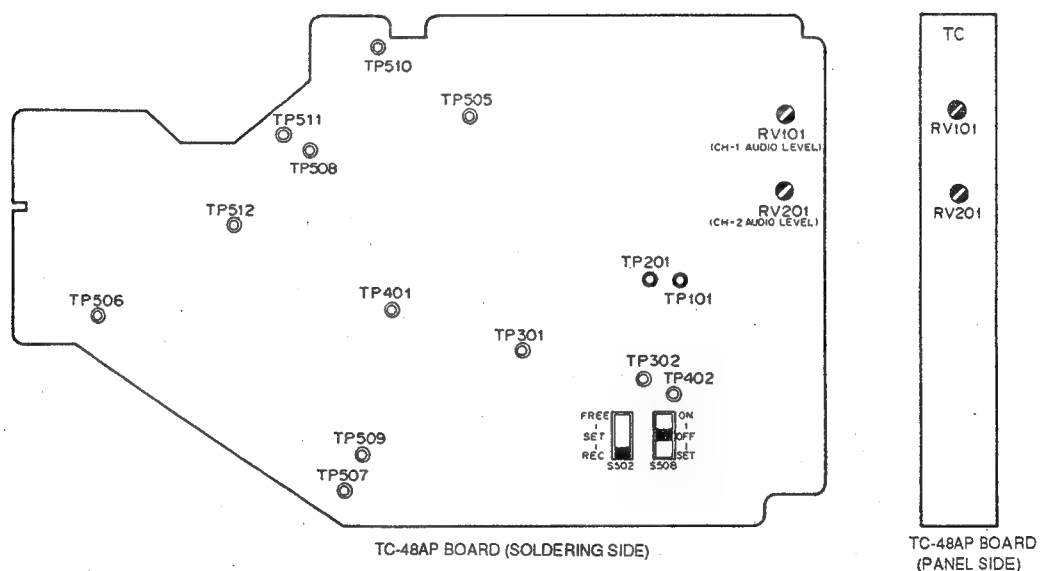
Board: TC-48AP board

• Preparation

- AUDIO SELECT CH-1/CH-2
SW→MAN
- AUDIO IN CH-1/CH-2 connector: 1kHz, +4dBu
- EJECT mode

• Adjustment procedures

- Test point : CH-1 : TP101/TC-48AP
CH-2 : TP201/TC-48AP
- Adj. point : CH-1 : ⓪RV101 (CH-1 AUDIO LEVEL)/TC-48AP (side panel)
CH-2 : ⓪RV201 (CH-2 AUDIO LEVEL)/TC-48AP (side panel)
- Spec. : $-10.0 \pm 0.1 \text{ dBu}$
WEIGHTING: DIN AUDIO



• Note

The adjustment level in this section is used as an audio system's reference level.
After that, never turn RV101 and RV201 during audio system adjustment.

8-4-2 Level Meter Adjustment

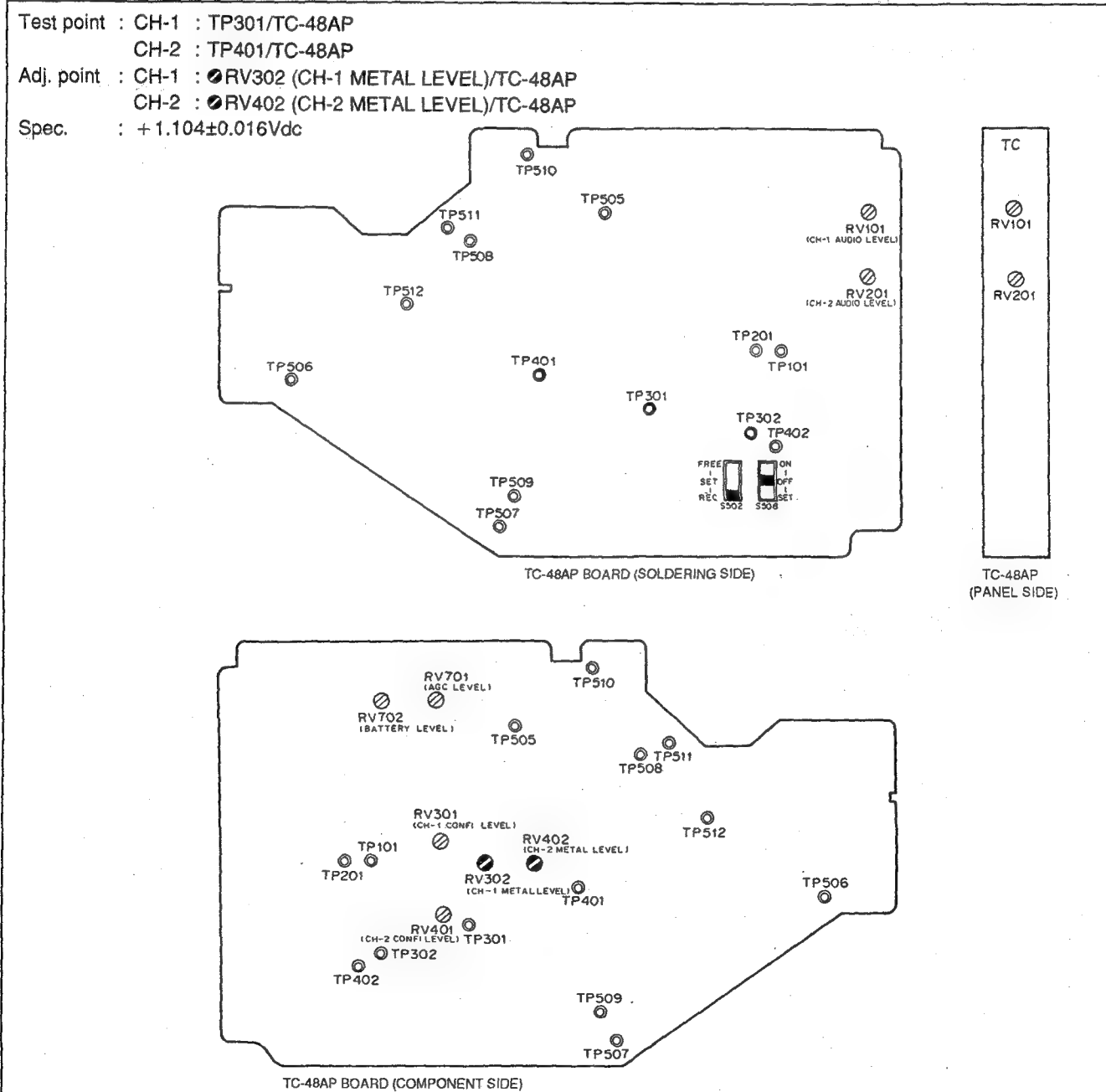
• Setting

Equipment: DC Volt Meter	Board: TC-48AP board
--------------------------	----------------------

• Preparation

• AUDIO SELECT CH-1/CH-2 SW→MAN
• AUDIO IN CH-1/CH-2 connector: 1kHz, +4dBu
• DC Voltmeter

• Adjustment procedures



8-4-3 CONFI Level Adjustment

• Setting

Equipment: Audio Noise Meter	Board: TC-48AP board
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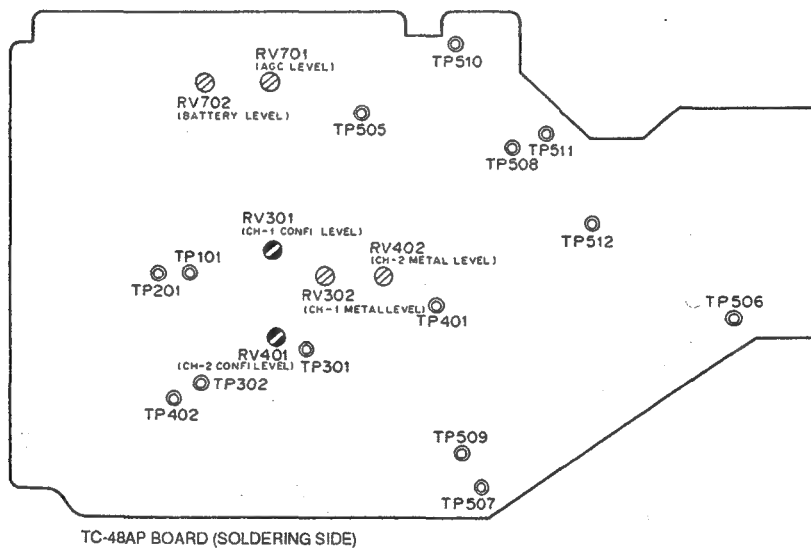
• Preparation

- AUDIO IN CH-1/CH-2 connector: 1kHz, +4dBu
- MONITOR SELECT SW → CH-1
- MONITOR control (side panel): Fully turn clockwise
- Insert the alignment tape CR5-1A and put the unit into the STOP mode.

• Adjustment procedures

- Test point : EARPHONE connector (8-ohm load)
- Adj. point : ① ●RV301 (CH-1 CONFI LEVEL)/TC-48AP
② ●RV401 (CH-1 CONFI LEVEL)/TC-48AP
- Spec. : ① (Calibrated value in adjustment procedure1) $\pm 0.1\text{dB}$
② (Calibrated value in adjustment procedure1) $\pm 1\text{dB}$

1. Take a note of the level at the EARPHONE Connector (8 load)
2. Play back the audio 1KHz/0dB portion of the alignment tape CR8-1APS.
3. Adjust ●RV301 (CH-1 CONFI LEVEL)/TC-48A to $\pm 0.1\text{dB}$ of the value calibrated in 1.
4. Set the MONITOR SELECT SW to CH-2.
5. Play back the audio 1KHz/0dB portion of the alignment tape CR8-1APS.
6. Adjust ●RV401 (CH-2 CONFI LEVEL)/TC-48A to $\pm 1\text{dB}$ of the value calibrated in 1.



• Note

- After having been adjusted, the monitor switch should be put into MIX.

8-4-4 CONFI TC Cancel Adjustment

• Setting

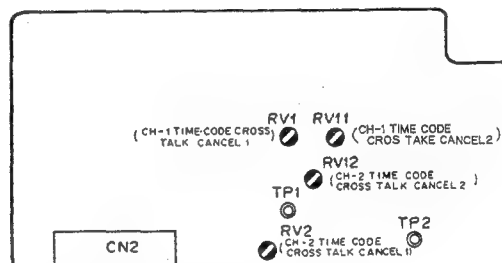
Equipment: Audio Noise Meter	Board: TB-5 board
------------------------------	-------------------

• Preparation

- AUDIO IN CH-1/CH-2 connector: 1kHz, +4dBu
- MONITOR control (side panel): Fully turn clockwise
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : EARPHONE connector (8-ohm load)
- Adj. point : CH-1: ●RV1 (CH-1 TIME CODE CROSS
TALK CANCEL 1)/TB5
●RV2 (CH-2 TIME CODE CROSS
TALK CANCEL 1)/TB5
CH-2: ●RV11 (CH-1 TIME CODE CROSS
TALK CANCEL 2)/TB5
●RV12 (CH-2 TIME CODE CROSS
TALK CANCEL 2)/TB5
- Spec. : Minimize the level.
WEIGHTING: CCIR ARM



TB-5 BOARD (COMPONENT SIDE)

8-4-5 Dolby Input Level Adjustment

• Setting

Equipment: Audio Noise Meter

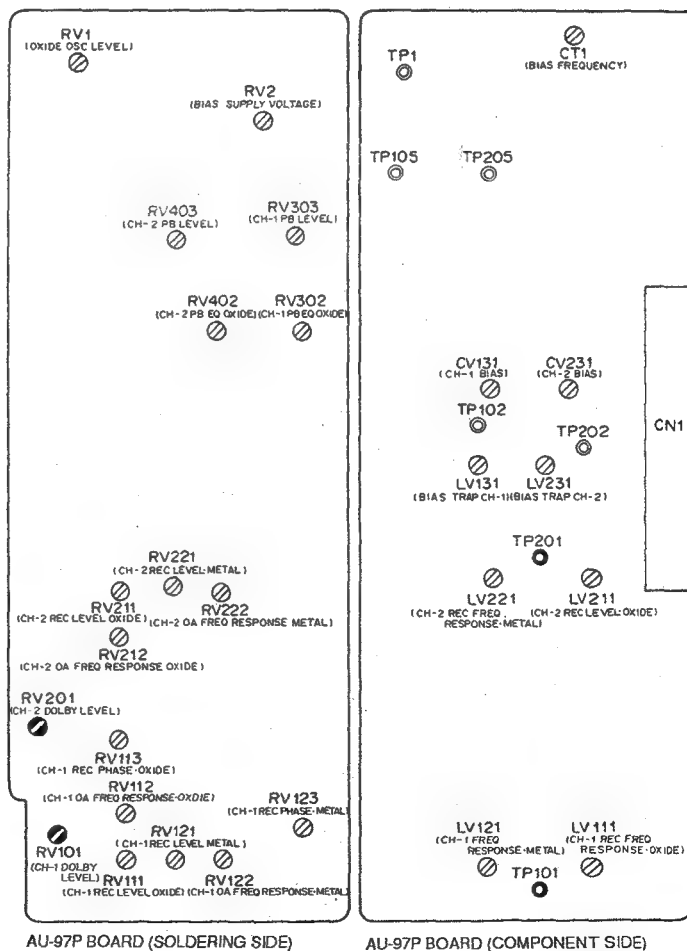
Board: AU-97P board

• Preparation

- AUDIO IN CH-1/CH-2 connector: 1kHz, +4dBu
- Insert the BCT-20G

• Adjustment procedures

- Test point : CH-1 : TP101/AU-97P
CH-2 : TP201/AU-97P
- Adj. point : ●RV101 (CH-1 DOLBY LEVEL)/AU-97P
●RV201 (CH-2 DOLBY LEVEL)/AU-97P
- Spec. : $-10.0 \pm 0.1 \text{ dBu}$
WEIGHTING: DIN AUDIO



8-4-6 Bias Supply Voltage Adjustment

• Setting

Equipment: DC Voltmeter

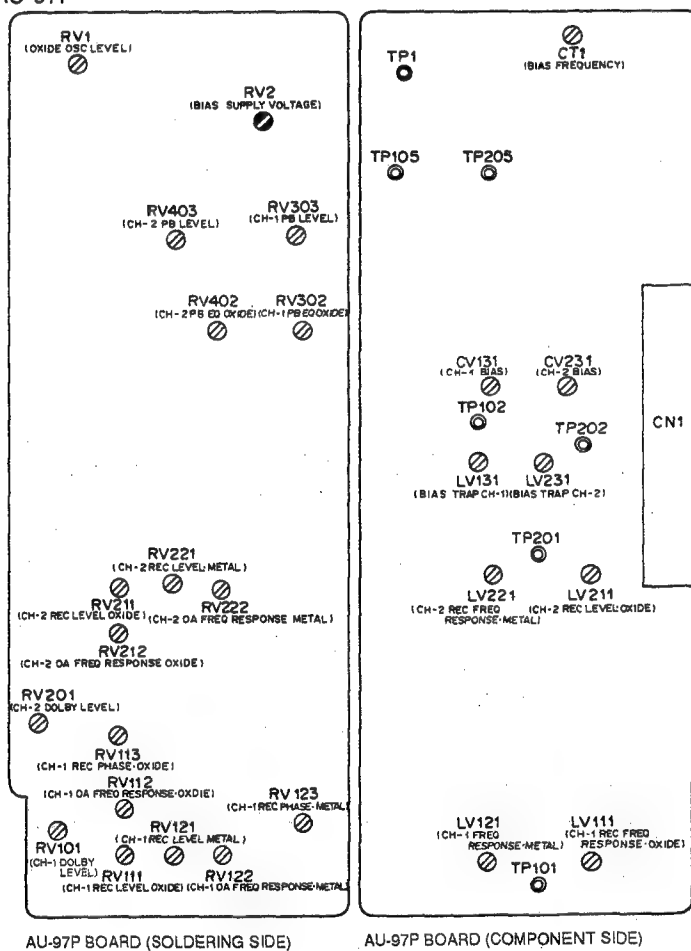
Board: AU-97P board

• Preparation

- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP1/AU-97P
- Adj. point : ●RV2 (BIAS SUPPLY VOLTAGE)/AU-97P
- Spec. : $+10.00 \pm 0.01 \text{Vdc}$



8-4-7 Bias Trap Adjustment

• Setting

Equipment: Frequency Counter

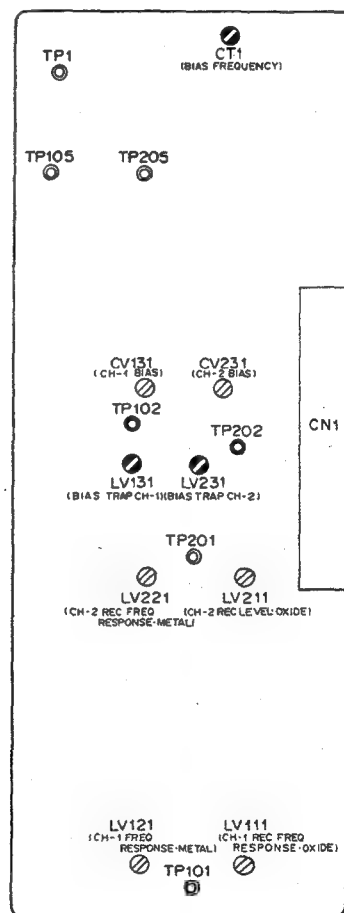
Board: AU-97P board

• Preparation

- AUDIO IN CH-1/CH-2 connector: No signal
- Insert the BCT-20M and put the unit into the REC mode.
- Connect the Frequency Counter to AC OUT connector on the Audio Noise Meter.

• Adjustment procedures

- Test point : CH-1 : TP102/AU-97P
CH-2 : TP202/AU-97P
- Adj. point : ① Bias frequency ●CT1/AU-97P
② Trap
CH-1 : ●LV131 (CH-1 BIAS TRAP)/AU-97P
CH-2 : ●LV231 (CH-2 BIAS TRAP)/AU-97P
- Spec. : ① $134 \pm 0.5 \text{ kHz}$
② Minimize the level. (+13dB or less)
WEIGHTING: WIDE BAND



AU-97P BOARD (COMPONENT SIDE)

8-4-8 Bias Current Adjustment

Step 1

• Note

- CH-1 and CH-2 should be adjusted at the same time.

• Setting

Equipment: Audio Noise Meter

Board: AU-97P board

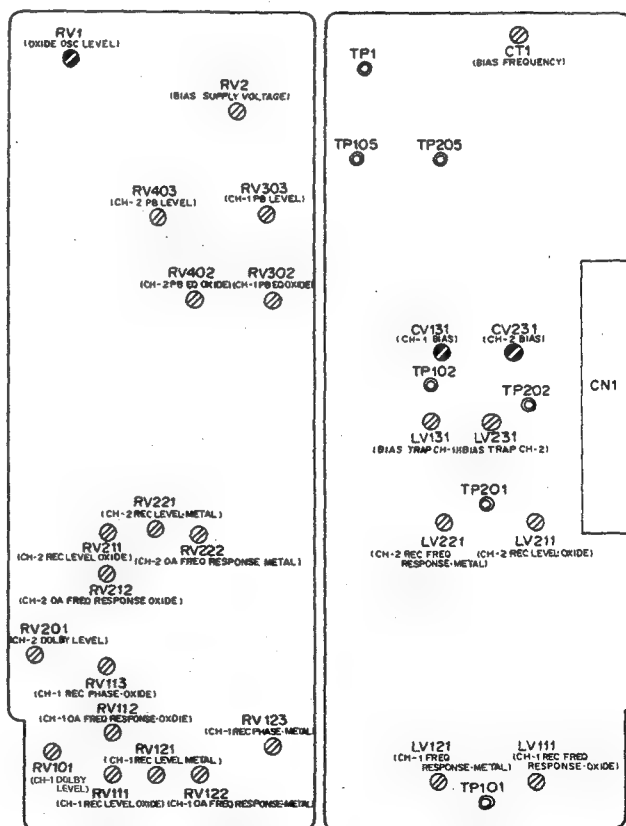
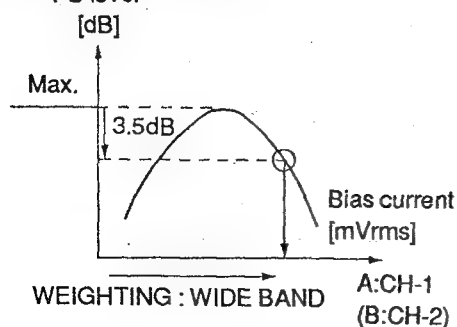
• Preparation

- AUDIO SELECT CH-1/CH-2 SW → MAN
- Preset RV1/AU-97P to the mechanical center.
- AUDIO IN CH-1/CH-2 connector: 5kHz, +4dBu
- MONITOR control (side panel): Fully turn clockwise
- CH-1 Adjustment
- MONITOR SELECT SW → CH-1
- CH-2 Adjustment
- MONITOR SELECT SW → CH-2

• Adjustment procedures

- Test point : CH-1 Adjustment
PB level: EARPHONE connector
Bias current: TP1/FL-55P
GND: E1/FL-55P
CH-2 Adjustment
PB level: EARPHONE connector
Bias current: TP11/FL-55P
GND: E1/FL-55P
- Adj. point : CH-1: ●CV131 (CH-1 BIAS)/AU-97P
CH-2: ●CV231 (CH-2 BIAS)/AU-97P
* IF the adjustment is not completed by ●CV131 and ●CV231, adjust by ●RV1 (OXIDE OSC LEVEL)/AU-97P
- Spec. : PB level

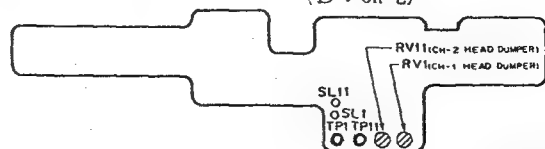
1. Insert the BCT-20K and put the unit into the REC mode.
2. Minimize the level.
3. Increase the bias current and maximize the PB level.
4. Further increase the bias current, and lower the PB level by 3.5dB from max level.
5. Take notes of the bias current A: CH-1 (B: CH-2).



AU-97P BOARD (SOLDERING SIDE)

AU-97P BOARD (COMPONENT SIDE)

(B: CH-2)



FL-55P BOARD (COMPONENT SIDE)

Step 2

• Setting

Equipment: Audio Noise Meter	Board: AU-97P board
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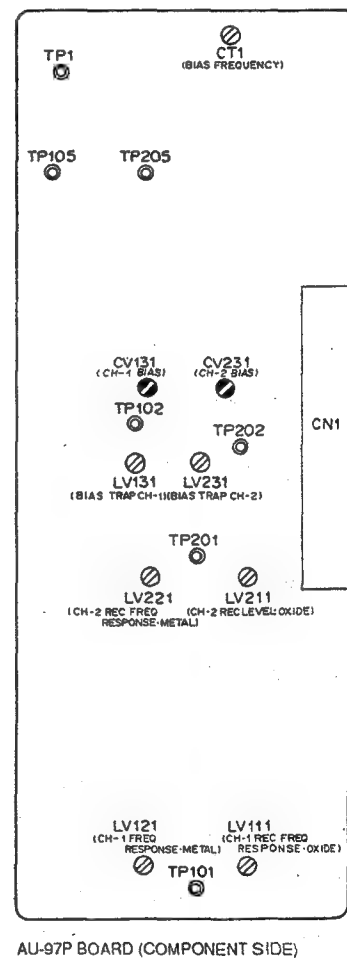
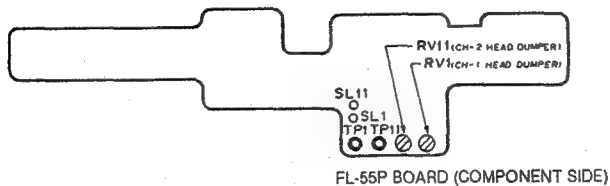
• Preparation

- AUDIO SELECT CH-1/CH-2 SW→MAIN
- Preset RV1/AU-97P to the mechanical center.
- AUDIO IN CH-1/CH2 connector: 5kHz, +4dBu
- MONITOR control (side panel): Fully turn clockwise.

• Adjustment procedures

- Test point : CH-1 : TP1/FL-55P
CH-2 : TP11/FL-55P
(GND : E1/FL-55P)
- Adj. point : CH-1 : CV131 (CH-1 BIAS)/AU-97P } (BCT-20M)
CH-2 : CV231 (CH-2 BIAS)/AU-97P }
- Spec. : CH-1 : A + 3 ± 0.1 mVrms (BCT-20M)
CH-2 : B + 3 ± 0.1 mVrms
- Spec. : CH-1 : A ± 0.1 mVrms (BCT-20G)
CH-2 : B ± 0.1 mVrms
WEIGHTING: WIDE BAND

1. Insert a blank tape (BCT-20M), and set the unit to the REC mode.
2. Assuming the values you took a note of in Step 1 as A and B, adjust as follows:
CH-1 : A + 3 ± 0.1 mVrms
CH-2 : B + 3 ± 0.1 mVrms
3. Insert a blank tape (BCT-20G), and set the unit to the REC mode.
4. Adjust to:
CH-1 : A ± 0.1 mVrms
CH-2 : B ± 0.1 mVrms



• Note

- 1: The bias frequency should be 134 ± 0.5 kHz.
- 2: After adjustments in step3 and 4 are completed, disconnect the extension board and install the AU-97P board on the unit then check the specification. If the specification is shifted, readjust step2 taking it into account.

8-4-9 Recording Current Tentative Adjustment

• Setting

Equipment: Audio Noise Meter	Board: AU-97P board
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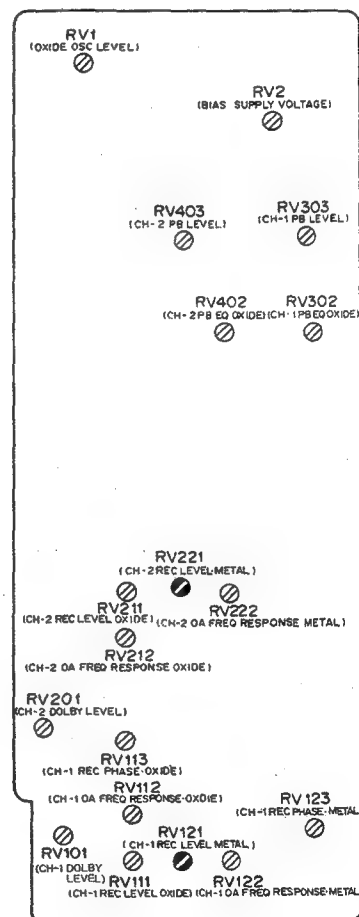
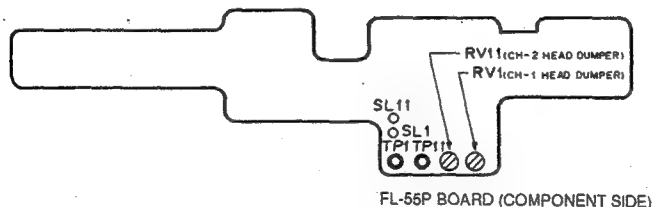
• Preparation

- AUDIO SELECT CH-1/CH-2 SW→MAN
- AUDIO IN CH-1/CH-2 connector: 1kHz, +4dBu

• Adjustment procedures

- Test point : BVW-300AP→REC mode
CH-1 : TP1/FL-55P
CH-2 : TP11/FL-55P
(GND : E1/F1-55P)
- Adj. point : CH-1 : ●RV121 (CH-1 REC LEVEL METAL)/AU-97P
CH-2 : ●RV221 (CH-2 REC LEVEL METAL)/AU-97P
- Spec. : +4.0±0.1dBm
WEIGHTING: DIN AUDIO

1. Insert the BCT-20M and put the unit into the REC mode.
2. Play back the recorded tape using a standard VTR (BVW-75P or the equivalent).
3. DOLBY NR ON/OFF→OFF
4. LINE OUT CH-1/CH-2connector: Standard VTR (Terminated in 600 ohms.)
5. If the specification is not satisfied, perform the following adjustment.
6. Replace the blank tape with an oxide tape (BCT-20G), and execute adjustment procedures 1 through 5.



AU-97P BOARD (SOLDERING SIDE)

C VTR SYSTEM ALIGNMENT IIIIIIIIIII

8-4-10 Overall Frequency Response Adjustment (Metal)

• Setting

Equipment: Audio Noise Meter	Board: AU-97P board
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• Preparation

• AUDIO SELECT CH-1/CH-2 SW→MAN

• Adjustment procedures

• Test point : BVW-300AP→REC mode

CH-1 : TP1/FL-55P

CH-2 : TP11/FL-55P

(GND : E1/FL-55P)

• Adj. point : CH-1 : ⚙RV122/AU-97P (7~10kHz)

CH-2 : ⚙RV222/AU-97P

CH-1 : ⚙RV121/AU-97P

CH-2 : ⚙RV221/AU-97P

(near 15kHz)

• Spec.

frequency	level (dB)
40Hz	Ref +1.5 -3
1kHz	Reference
7kHz	Ref ±1
10kHz	Ref +1 -1.5
15kHz	Ref +1 -2

WEIGHTING: WIDE BAND

1. Insert the BCT-20M and put the unit into the REC mode.
2. Sequentially supply 40Hz, 1kHz, 7kHz, 10kHz and 15kHz/-16dBu signals to the AUDIO IN CH-1/CH-2 connector for thirty seconds.
3. Play back the recorded tape using a standard VTR (BVW-75 or the equivalent).
4. Correct the overage and shortage of the level in the check procedure and confirm that the required specification is satisfied.

: When the intermediate frequency is low

CH-1 : Turn ⚙RV122/AU-97P counterclockwise.

CH-2 : Turn ⚙RV222/AU-97P counterclockwise.

: When the intermediate frequency is high

CH-1 : Turn ⚙RV122/AU-97P clockwise.

CH-2 : Turn ⚙RV222/AU-97P clockwise.

: When the high frequency is low (near 15kHz)

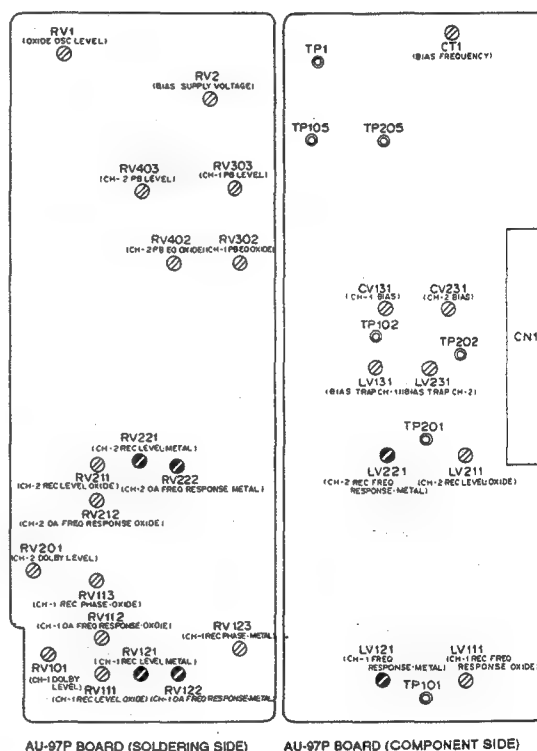
CH-1 : Turn ⚙LV121/AU-97P clockwise.

CH-2 : Turn ⚙LV221/AU-97P clockwise.

: When the high frequency is high

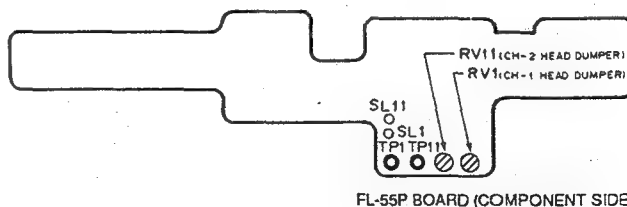
CH-1 : Turn ⚙LV121/AU-97P counterclockwise.

CH-2 : Turn ⚙LV221/AU-97P counterclockwise.



AU-97P BOARD (SOLDERING SIDE)

AU-97P BOARD (COMPONENT SIDE)



FL-55P BOARD (COMPONENT SIDE)

8-4-11 Overall Frequency Response Adjustment (Oxide)

• Setting

Equipment: Audio Noise Meter	Board: AU-97P board
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• Preparation

- AUDIO SELECT CH-1/CH-2 SW→MAN
- DOLBY NR ON/OFF SW→ON

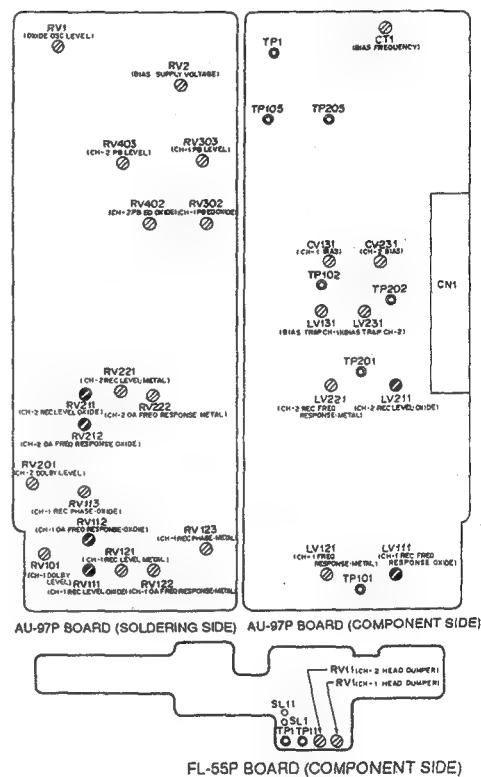
• Adjustment procedures

- Test point : BVW-300AP→REC mode
CH-1 : TP1/FL-55P
CH-2 : TP11/FL-55P
(GND : E1/FL-55P)
- Adj. point : CH-1 : ⚙RV112 /AU-97P) (7~10kHz)
CH-2 : ⚙RV212 /AU-97P)
CH-1 : ⚙RV111/AU-97P) (near 15kHz)
CH-2 : ⚙RV211/AU-97P)

• Spec.

frequency	level (dB)
40Hz	Ref ±3.0
1kHz	Reference
7kHz	Ref ±1
10kHz	Ref +1 -1.5
15kHz	Ref +1 -2

WEIGHTING: WIDE BAND



1. Insert the BCT-20G and put the unit into the REC mode.
2. Sequentially supply 40Hz, 1kHz, 7kHz, 10kHz and 15kHz/-16dBu signals to the AUDIO IN CH-1/CH-2 connector for thirty seconds.
3. Play back the recorded tape using a standard VTR (BVW-75 or the equivalent).
(DOLBY NR ON/OFF SW→ON)
LINE OUT CH-1/CH-2 connector: Standard VTR (Terminated in 600 ohms.)
4. Correct the overage and shortage of the level in the check procedure and confirm that the required specification is satisfied.

: When the intermediate frequency is low (7 to 10kHz) CH-1 : Turn ⚙RV112/AU-97P counterclockwise. CH-2 : Turn ⚙RV212/AU-97P counterclockwise. : When the intermediate frequency is high CH-1 : Turn ⚙RV112/AU-97P clockwise. CH-2 : Turn ⚙RV212/AU-97P clockwise.	: When the high frequency is low (near 15kHz) CH-1 : Turn ⚙LV111/AU-97P clockwise. CH-2 : Turn ⚙LV211/AU-97P clockwise. : When the high frequency is high CH-1 : Turn ⚙LV111/AU-97P counterclockwise. CH-2 : Turn ⚙LV211/AU-97P counterclockwise.
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• Note

- After adjustment is completed, turn the DOLBY NR ON/OFF switch to OFF.

8-4-12 Overall Recording Current Adjustment

• Setting

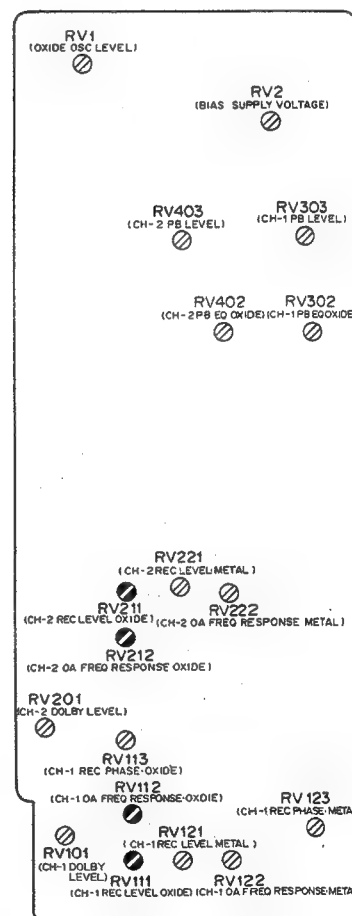
Equipment: Audio Noise Meter	Board: AU-97P board
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• Preparation

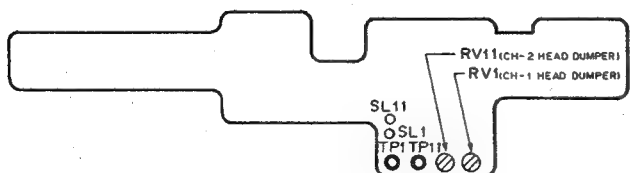
<ul style="list-style-type: none"> AUDIO SELECT CH-1/CH-2 SW→MAN AUDIO IN CH-1/CH-2 connector: 1kHz, +4dBu
--

• Adjustment procedures

- Test point : BVW-300AP→REC mode
CH-1 : TP1/FL-55P
CH-2 : TP11/FL-55P
(GND : E1/F1-55P)
 - Adj. point : CH-1 : ●RV112/AU-97P
CH-2 : ●RV212/AU-97P
CH-1 : ●RV111/AU-97P) (BCT-20M)
CH-2 : ●RV211/AU-97P
 - Spec. : +4.0 ±0.1dBm
WEIGHTING: DIN AUDIO
- Insert the BCT-20M and put the unit into the REC mode.
 - Play back the recorded tape using a standard VTR (BVW-75P or the equivalent).
 - LINE OUT CH-1/CH-2 connector: Standard VTR (Terminated in 600 ohms.)
 - Correct the overage and shortage of the level in the check procedure and confirm that the required specification is satisfied.
 - Replace with a blank tape (BCT-20G), and execute steps 1 through 3 (Set DOLBY NR ON/OFF SW to OFF).



AU-97P BOARD (SOLDERING SIDE)



FL-55P BOARD (COMPONENT SIDE)

8-4-13 Channel-to-Channel Phase adjustment (Oxide)

• Setting

Equipment: Dualtrace Oscilloscope

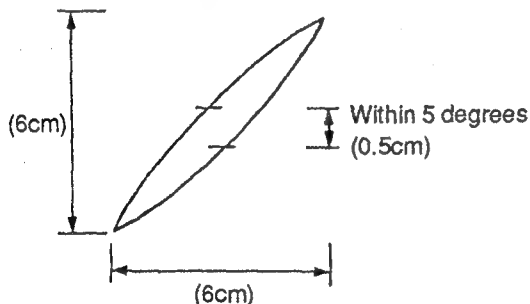
Board: AU-97P board

• Preparation

- AUDIO SELECT CH-1/CH-2 SW→MAN
- AUDIO IN CH-1/CH-2 connector: 15kHz, +4dBu

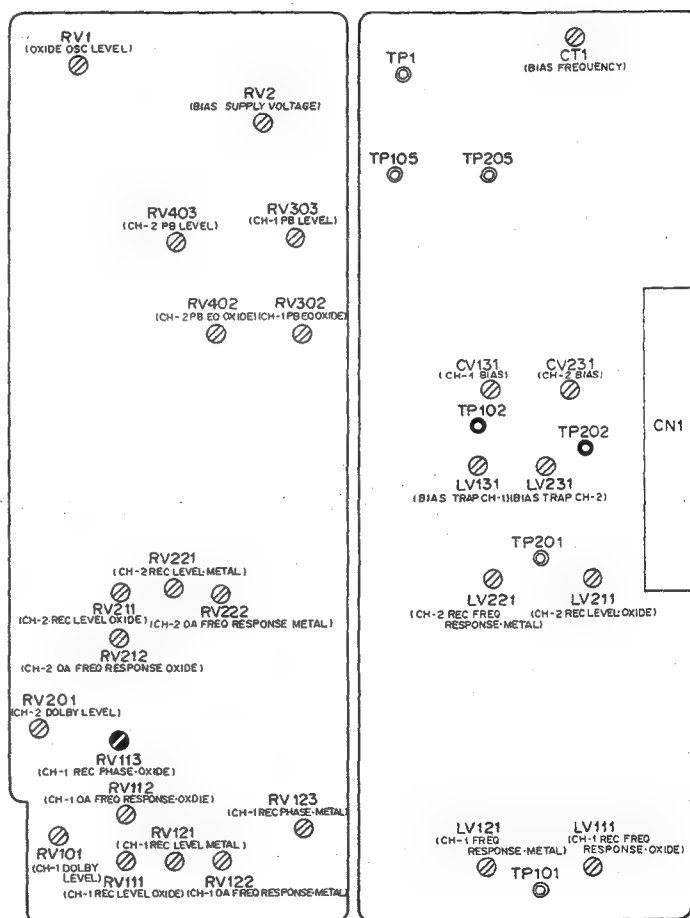
• Adjustment procedures

- Test point : BVW-300AP→REC mode
CH-1 : TP102/AU-97P
CH-2 : TP202/AU-97P
- Adj. point : ●RV113 (CH-1 REC PHASE)/AU-97P
- Spec.



Oscilloscope : XY mode

1. Insert the BCT-20G and put the unit into the REC mode.
2. Play back the recorded tape using a standard VTR (BVW-75P or the equivalent).
LINE OUT CH-1/CH-2 connector: Standard VTR (Terminated in 600 ohms.)
3. Short between TP35 and TP47 on the extension board with the shorting clip.
4. Correct the shifted portion of the phase in the check procedure and confirm that the required specification is satisfied.



AU-97P BOARD (SOLDERING SIDE)

AU-97P BOARD (COMPONENT SIDE)

• Note

- After adjustment is completed, remove the shorting clip.

8-4-14 Channel-to-Channel Phase adjustment (Metal)

• Setting

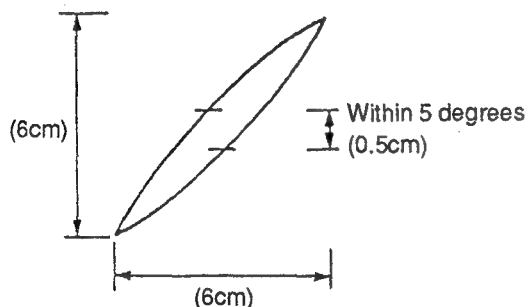
Equipment: Dualtrace Oscilloscope	Board: AU-97P board
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• Preparation

<ul style="list-style-type: none"> AUDIO SELECT CH-1/CH-2 SW→MAN AUDIO IN CH-1/CH-2 connector: 15kHz, +4dBu

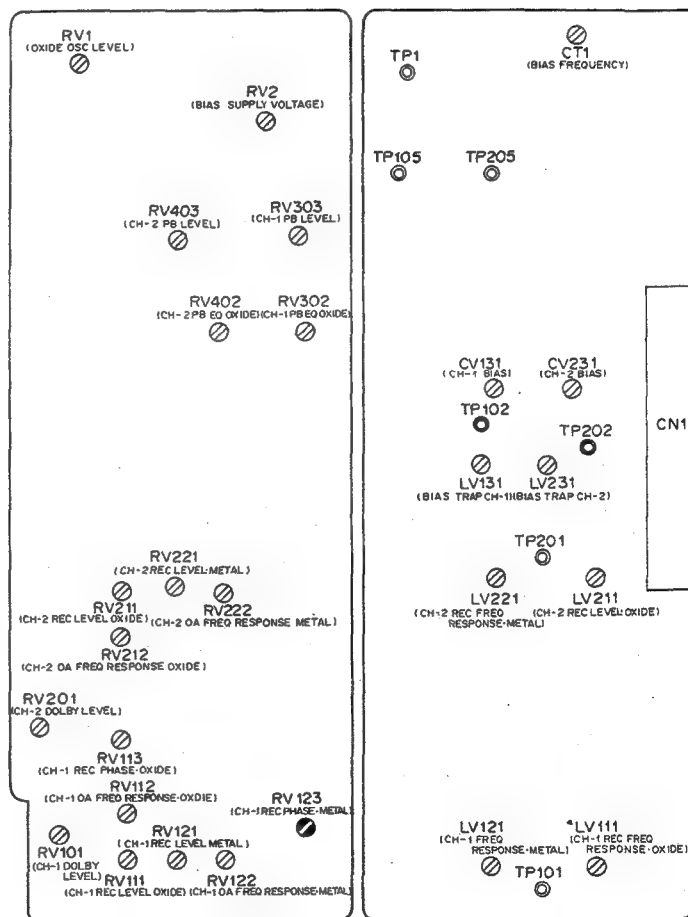
• Adjustment procedures

- Test point : BVW-300AP→REC mode
CH-1 : TP102/AU-97P
CH-2 : TP202/AU-97P
- Adj. point : ●RV123 (CH-1 REC PHASE)/AU-97P
- Spec.



Oscilloscope : XY mode

- Insert the BCT-20G and put the unit into the REC mode.
- Play back the recorded tape using a standard VTR (BVW-75P or the equivalent).
LINE OUT CH-1/CH-2 connector: Standard VTR (Terminated in 600 ohms.)
- Short between TP35 and TP47 on the extension board with the shorting clip.
- Correct the shifted portion of the phase in the check procedure and confirm that the required specification is satisfied.



AU-97P BOARD (SOLDERING SIDE)

AU-97P BOARD (COMPONENT SIDE)

• Note

- After adjustment is completed, remove the shorting clip.

8-4-15 PB Amp Reference Level Adjustment

• Setting

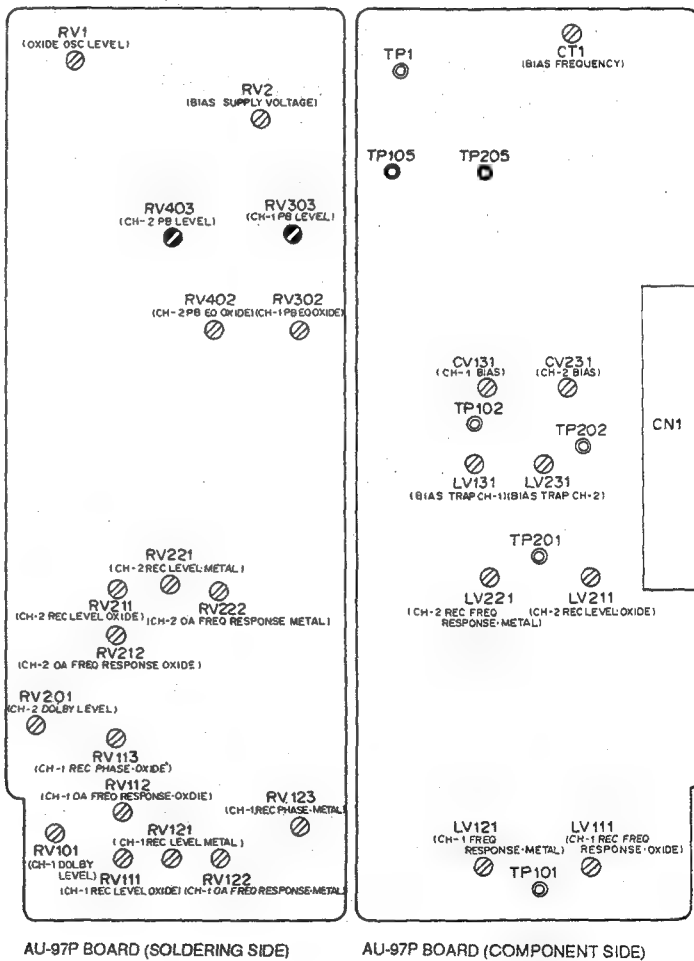
Equipment: Audio Noise Meter	Board: AU-97P board
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• Preparation

• AUDIO SELECT CH-1/CH-2 SW→MAN

• Adjustment procedures

- Test point: CH-1 : TP105/AU-97P
CH-2 : TP205/AU-97P
- Adj. point: CH-1 : ●RV303 (CH-1 PB LEVEL)/AU-97P
CH-2 : ●RV403 (CH-2 PB LEVEL)/AU-97P
- Spec. : ① $-10.0 \pm 0.1 \text{ dB}\mu$
② $-10.0 \pm 0.5 \text{ dB}\mu$
WEIGHT: DIN AUDIO
- 1. AUDIO IN CH-1/CH-2 connector: 1kHz, +4dBu
- 2. Insert the BCT-20G and put the unit into the REC mode.
- 3. Play back the self-recorded portion.
- 4. Adjust to Standard ①.
- 5. Playback the audio 1KHz/0dB portion of the alignment tape CR8-1APS.
- 6. Adjust to Standard ②.
- 7. If the specification is not satisfied, readjust step 1. But if not, perform the audio head height adjustment in Sec. 6-13.



8-4-16 PB Amp Frequency Response Adjustment

Step 1

• Setting

Equipment: Audio Noise Meter	Board: AU-97P board
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• Preparation

- AUDIO SELECT CH-1/CH-2 SW→MAN
- DOLBY NR ON/OFF SW→ON
- Connect the PB Adaptor (VA-500 or VA-510). (DOLBY NR ON/OFF SW→ON)
- Insert the BCT-20G and put the unit into the REC mode.
- Sequentially supply 40Hz, 1kHz, 7kHz, 10kHz and 15kHz/−16dBu signals to the AUDIO IN CH-1/CH-2 connector for thirty seconds.
- Select the Audio PB channel CH-1/CH-2 of the PB Adaptor and perform the adjustment. (Spec ①)
- Insert the BCT-20M and put the unit into the REC mode.
- Sequentially supply 40Hz, 1kHz, 7kHz, 10kHz and 15kHz/−16dBu signals to the AUDIO IN CH-1/CH-2 connector for thirty seconds.
- Select the Audio PB channel CH-1/CH-2 of the PB Adaptor and perform the adjustment. (Spec ②)
- AUDIO OUT connector/PB Adaptor (Terminated in 600 ohms.)

• Adjustment procedures

- Test point : CH-1 : TP1/FL-55P
CH-2 : TP11/FL-55P
- Adj. point : Intermediate-frequency response
CH-1 : ●RV302 (CH-1 PB EQ)/AU-97P
CH-2 : ●RV402 (CH-2 PB EQ)/AU-97P
High-frequency response
CH-1 : ●RV1 (CH-1 HEAD DUMPER) FL-55P
CH-2 : ●RV11 (CH-2 HEAD DUMPER) FL-55P

• Spec.

① Oxide

Frequency	Level (dB)
40Hz	Ref ±3
1kHz	Reference
7kHz	Ref ±1
10kHz	Ref ⁺¹ −1.5
15kHz	Ref ⁺¹ −2

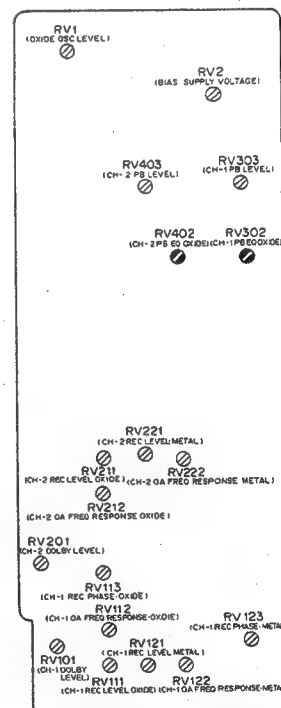
② Metal

Frequency	Level (dB)
40Hz	Ref ^{+1.5} −3
1kHz	Reference
7kHz	Ref ±1
10kHz	Ref ⁺¹ −1.5
15kHz	Ref ⁺¹ −2

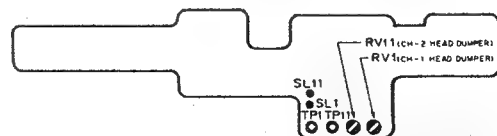
WEIGHTING: WIDE BAND

Adjust so that the specifications of the oxide and metal are satisfied.

When the high-frequency level is low after ●RV1 and ●RV11 on the FL board are turned fully clockwise, solder the points below and readjust.



AU-97P BOARD (SOLDERING SIDE)



FL-55P BOARD (COMPONENT SIDE)

• Note

- After adjustment is completed, disconnect the PB Adaptor.

Step 2

• Setting

Equipment: Audio Noise Meter

Board: AU-97P board

• Preparation

- AUDIO SELECT CH-1/CH-2 SW→MAN
- DOLBY NR ON/OFF SW→ON
- Play back the audio 1kHz (reference), 40Hz, 7kHz, 10kHz and 15kHz signals on the alignment, tape CR8-1APS.
- AUDIO OUT connector/PB Adaptor (terminated in 600 ohms.)

• Adjustment procedures

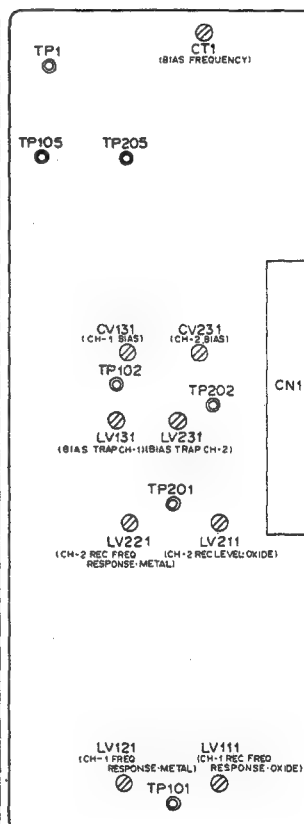
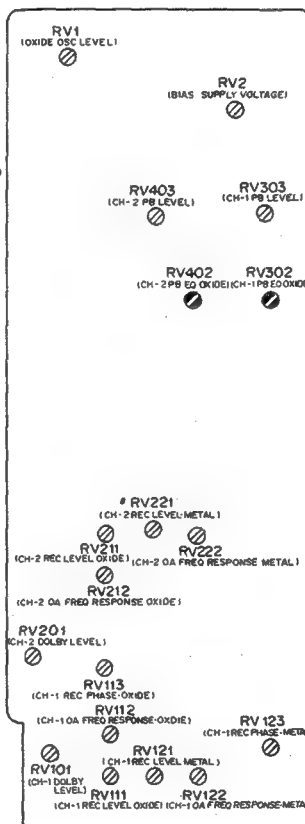
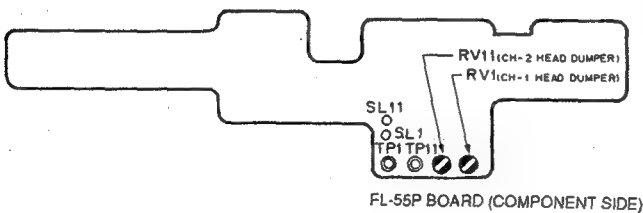
- Test point : CH-1 : TP105/AU-97P
CH-2 : TP205/AU-97P
- Adj. point : Intermediate-frequency response
CH-1 : ⚙RV302 (CH-1 PB EQ)/AU-97P
CH-2 : ⚙RV402 (CH-2 PB EQ)/AU-97P
High-frequency response
CH-1 : ⚙RV1 (CH-1 HEAD DUMPER) FL-55P
CH-2 : ⚙RV11 (CH-2 HEAD DUMPER) FL-55P

• Spec.

Frequency	Level (dB)
40Hz	Ref ±3
1kHz	Reference
7kHz	Ref ±3
10kHz	Ref ±3
15kHz	Ref ±3

WEIGHTING: WIDE BAND

- If the specification is not satisfied, readjust step 1.
But if not, perform the tape run alignment in Sec. 6.



8-4-17 AFM Carrier Frequency Adjustment

• Setting

Equipment: Frequency Counter	Board: AFM-6P board
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• Preparation

- AUDIO IN CH-1/CH-2 connector: No signal
- Insert the BCT-20M and put the unit into the REC mode.

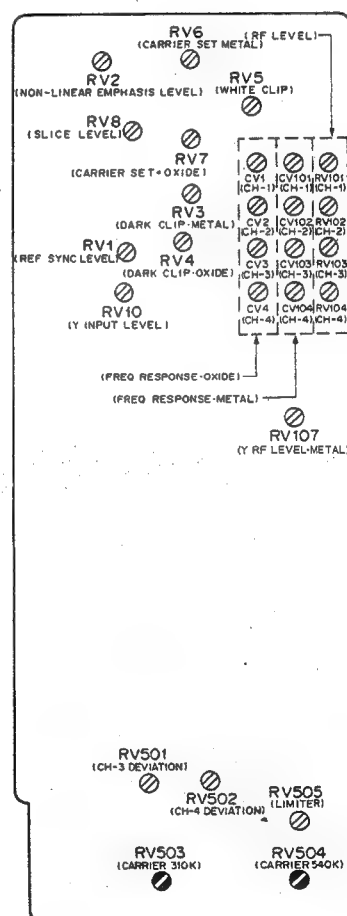
• Adjustment procedures

1. CARRIER 310KHz Adj.

- Test point : TP35/Extension board
- Adj. point : ●RV503 (CARRIER 310K)/AFM-6P
- Spec. : 310 ± 1 KHz

2. CARRIER 540KHz Adj.

- Test point : TP36/Extension board
- Adj. point : ●RV504 (CARRIER 540K)/AFM-6P
- Spec. : 540 ± 1 KHz



AFM-6 BOARD(SOLDERING SIDE)

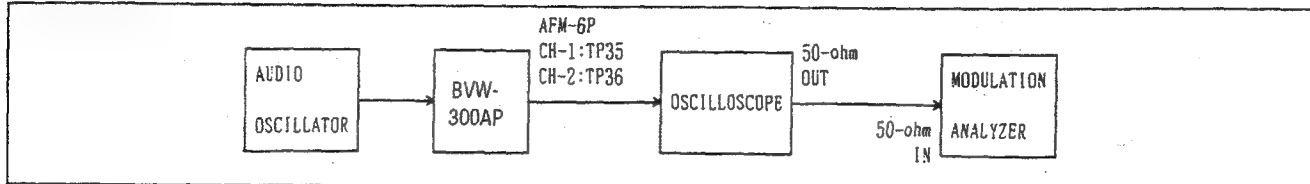
8-4-18 AFM Deviation Adjustment

• Setting

Equipment: Frequency Counter

Board: AFM-6P board

• Connection



• Preparation

- AUDIO IN CH-1/CH-2 connector: 400Hz, +4dBu (Ref. Level)
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

1. CH-3 DEVIATION

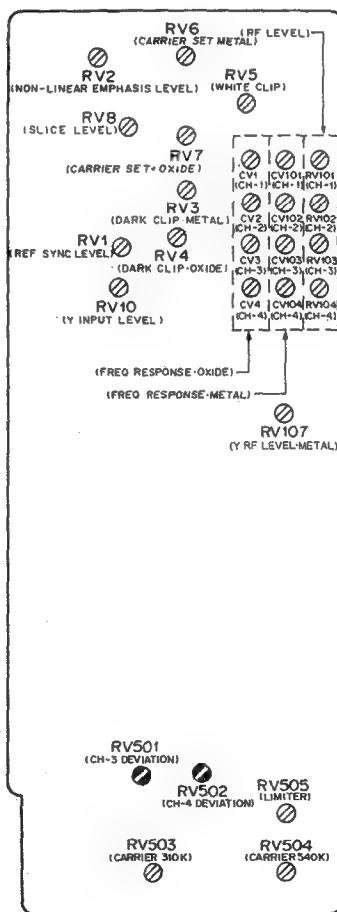
- Test point : TP505/AFM-6P
- Adj. point : ●RV501 (CH-3 DEVIATION)/AFM-6P

- Spec. : $+4 \pm 0.1\text{dBm}$

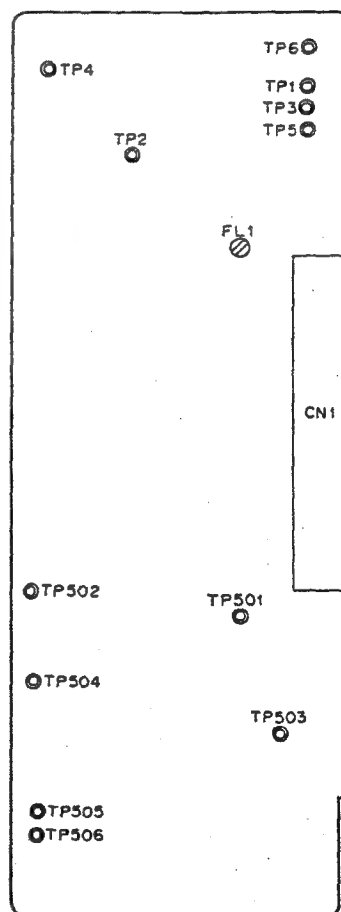
2. CH-4 DEVIATION

- Test point : TP506/AFM-6P
- Adj. point : ●RV502 (CH-4 DEVIATION)/AFM-6P

- Spec. : $+4 \pm 0.1\text{dBm}$



AFM-6P BOARD (SOLDERING SIDE)



AFM-6P BOARD (COMPONENT SIDE)

Step

Equipment: Frequency counter	Board: AFM-6P board
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```

graph LR
    AO[AUDIO OSCILLATOR] --> BVW[BVW-300AP]
    BVW -- "AFM-6P  
CH-1:TP35  
CH-2:TP36" --> O[OSCILLOSCOPE]
    O -- "50-ohm OUT" --> MA[MODULATION ANALYZER]
    MA -- "50-ohm IN" --> O
  
```

- S103/TC-48A→OFF
- S203/TC-48A→OFF
- AUDIO SELECT
CH-1/CH-2 SW→MAN
- AUDIO IN CH-1/CH-2 SW →REAR MIC
- AUDIO IN CH-1/CH-2 connector: 400Hz, -40dBu (Ref. level +20dBu)
- Insert the BCT-20M and put the unit into the REC mode.

Adjustment procedures

- Test point : CH-1 : TP505/AFM-6P
CH-2 : TP506/AFM-6P
- Adj. point : ●RV505 (LIMITER)/AFM-6P
- Spec. : 77±2kHz

The point where a wave-form starts to be distorted.

AFM-6P BOARD (SOLDERING SIDE)

AFM-6P BOARD (COMPONENT SIDE)

- After adjustment is completed, set the S103 and S203 on the TC-48A board to ON.

The video system adjustment method has been changed along with the changes of the video board (VDA-11). Adjust according to the serial number on the right.

Serial No.	Adjustment page
41954 through 44160	8-31~8-88

8-5. VIDEO SYSTEM ADJUSTMENT

【Equipment】

- Component signal Generator: TEKTRONIX TSG-300 or the equivalent
- Digital Voltmeter
- Dual trace Oscilloscope
- Frequency counter
- Sweep Generator
- Spectrum Analyzer
- DC power: AC-500 or the equivalent
- Waveform Vector Monitor: TEKTRONIX 1751 or the equivalent
- Standard VTR player: BVW-75P or the equivalent
- Rec Current Adj Tool: EW-594 (J-6335-940-A)
- Video signal Input Board: EW-573 (J-6335-730-A)
- Blank tape: BCT-20G or BCT-20M
- Alignment Tape: CR5-2APS (8-960-098-44): OXIDE
CR5-1BPS (8-960-096-91): METAL
- Deviation checker: EW-579 (J-6335-790-A)
- Setup attenuator tool: EW-607 (J-6336-070-A)

【Switches setting on the function panel】

Do not change the setting below unless otherwise specified.

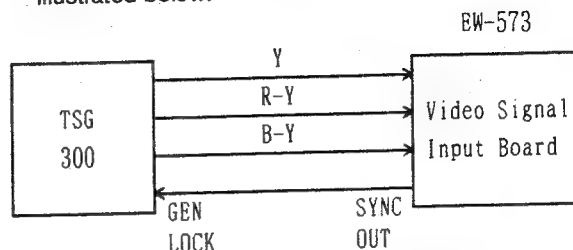
- VTR switch: STBY
- OUTPUT/DCC selector: BARS

*Alignment tape: CR5-2APS

TIME min.sec	VIDEO TRACK	DESCRIPTION
0:00	75% Color Bar	
3:00	Multi Burst	Y : 0.5,1,2,3,4,1,4.5 MHz C : 0.2,0.5,1,1.5 MHz
6:00	Bowtie & 10T	C : No Signal
9:00	Pulse & Bar	
11:00	Sw'P Shifted	
13:00	Composite Monoscope	Video Phase
15:00		

【Preparation】 (When using the signal except from the built-in color-bar.)

1. Remove the EN-79P board.
2. Insert the Video Signal Input Board and connect as illustrated below.



3. After adjustment is completed, install the EN-79P board and check (or readjust) Sec. 8-5-3 and 8-5-14 using a BARS signal from the camera.

*Alignment tape: CR5-1BPS

TIME min.sec	VIDEO	AFM
0:00	RF SWEEP Marker 1, 2, 4, 6, 8, 10, 12 MHz	No-Signal
2:00	60% H, SWEEP (CTDM) Marker 0.5, 1, 2, 3, 4, 5 MHz	
5:00	PULSE & BAR (CTDM)	
8:00	MULTI BURST Y : 0.5,1,2,4,5,5.5 MHz C : 0.2,0.5,1,1.5,2 MHz	
11:00	PULSE & BAR	
14:00		400Hz sine wave (25KHz deviation) (75KHz deviation)
16:30	100% COLOR BARS	
17:00	50% BOWTIE & 10T	No-Signal
19:00	LINE 17A SIGNAL	
22:00	QUAD PHASE	
24:00	FLAT FIELD	
26:00	100% COLOR BARS with dropout	
28:00	COMPOSITE H, SWEEP with VISC	
30:00		

8-5-1. CCD Clock VCO Adjustment


- Setting

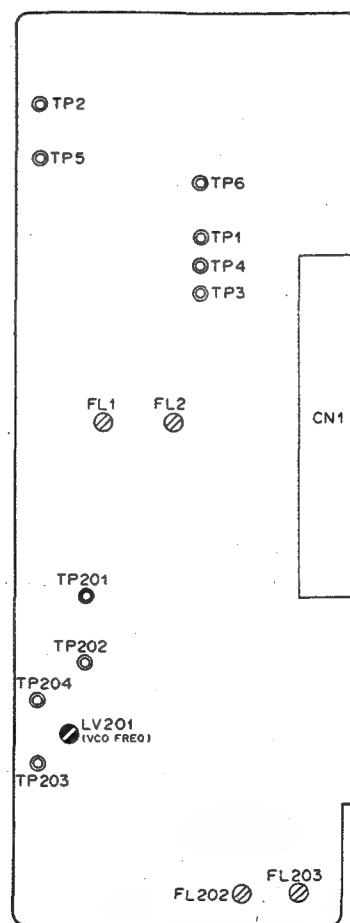
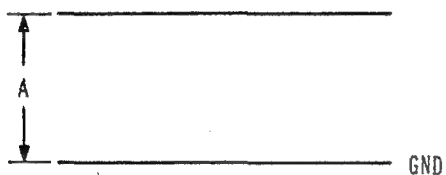
Equipment: Dualscope Oscilloscope	Board: VDA-11P board
-----------------------------------	----------------------

- Preparation

<ul style="list-style-type: none"> • built-in color-bar • Insert the BCT-20M and put the unit into the REC mode.
--

- Adjustment procedures

- Test point : TP201/VDA-11P
- Adj. point :  LV201 (VCO FREQ)/VDA-11P
- Spec. : $A=2.5\pm0.05V_{dc}$



VDA-11P BOARD (COMPONENT SIDE)

8-5-2. CCD Clock Bias Adjustment

• Setting

Equipment: Dualscope Oscilloscope

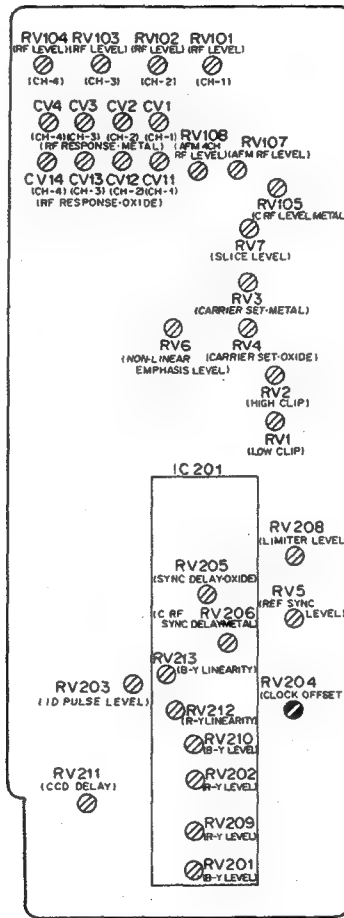
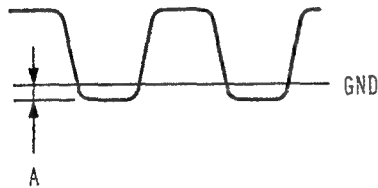
Board: VDA-11P board

• Preparation

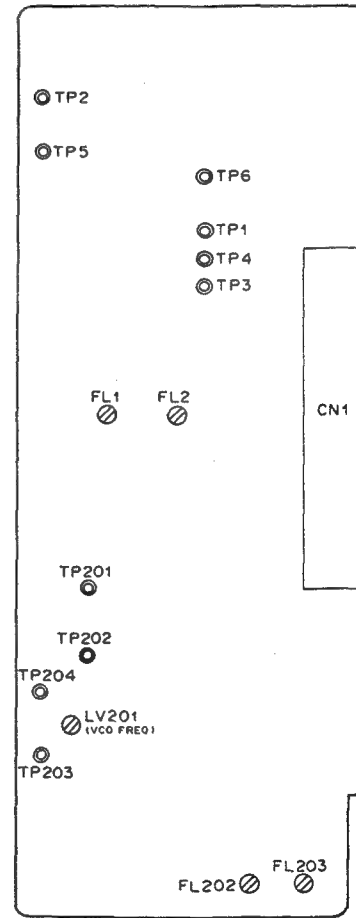
- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP202/VDA-11P
- Adj. point : ●RV204 (CLOCK OFFSET)/VDA-11P
- Spec. : $A = -0.5 \pm 0.1 \text{Vdc}$



VDA-11P BOARD (SOLDERING SIDE)



VDA-11P BOARD (COMPONENT SIDE)

8-5-3. CCD Output Level Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

Board: VDA-11P board

• Preparation

- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

• Test point : TP3/VDA-11P

• Adj. point : B-Y Level

• RV201 (B-Y LEVEL)/VDA-11P

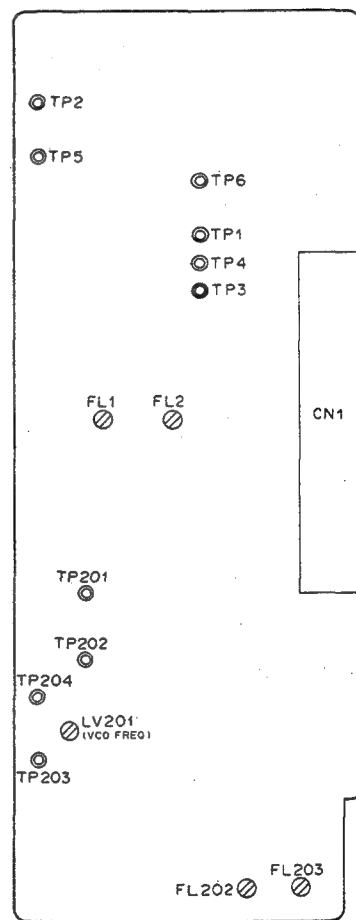
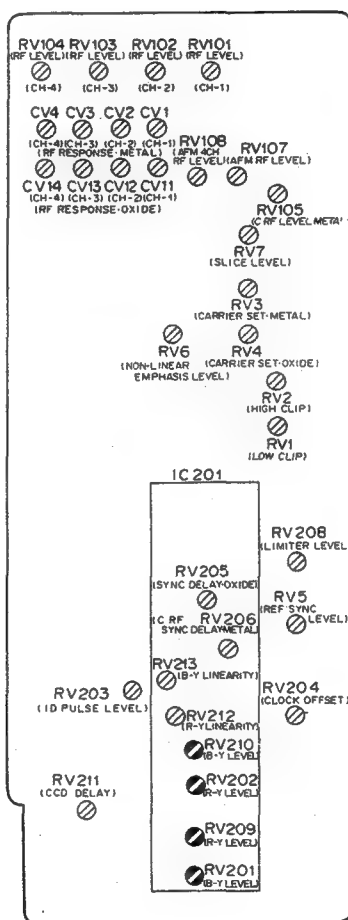
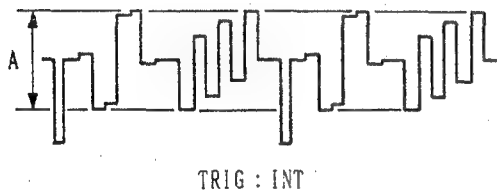
• RV209 (R-Y LEVEL)/VDA-11P

: R-Y Level

• RV202 (R-Y LEVEL)/VDA-11P

• RV210 (B-Y LEVEL)/VDA-11P

• Spec. : A = CCD output level in each channel
= $0.5 \pm 0.01V$



8-5-4. High Chroma Slice Level Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

Board: VDA-11P board

• Preparation

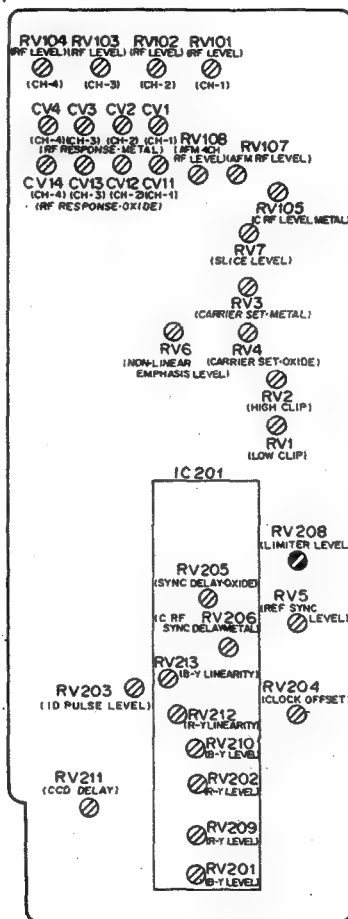
- Input signal: 75% color-bar (chroma: +6 dB)
- Insert the BCT-20M and put the unit into the REC mode.
- If the chroma level of the Signal Generator can not be +6dB, remove the R-Y, B-Y terminated resistors R3 and R4 on the Video Signal Input Board (EW-573) temporarily and perform the adjustment.

• Adjustment procedures

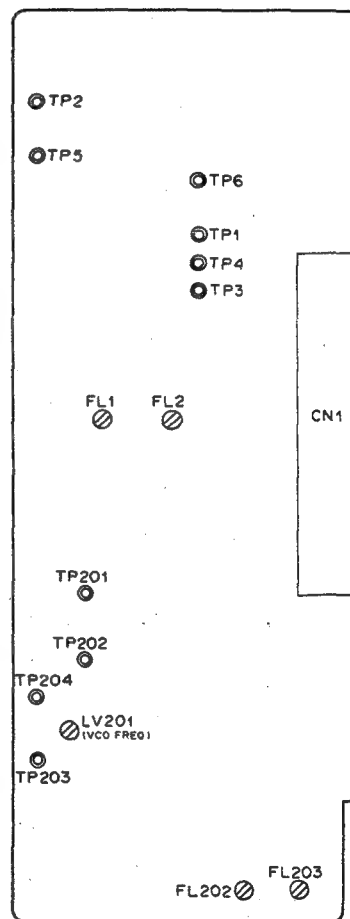
- Test point : TP3/VDA-11P
- Adj. point : RV208 (LIMITER LEVEL)/VDA-11P
- Spec. : $A = 0.442 \pm 0.05V$



TRIG : INT



VDA-11P BOARD (SOLDERING SIDE)



VDA-11P BOARD (COMPONENT SIDE)

8-5-5. C REF Sync Level Adjustment

• Setting

Equipment: Dualtrace Oscilloscope	Board: VDA-11P board
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• Preparation

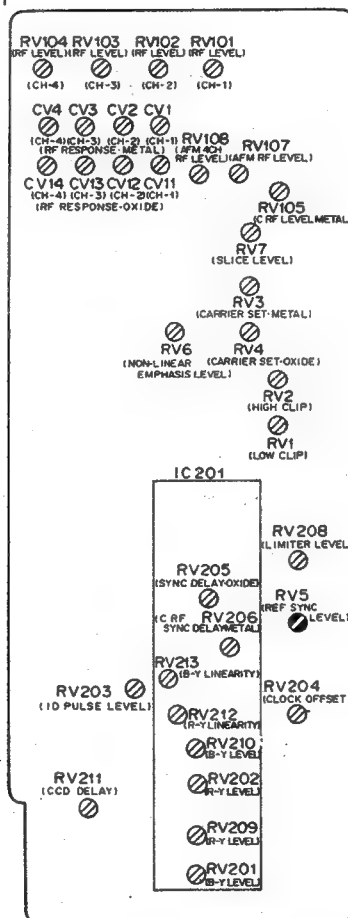
- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

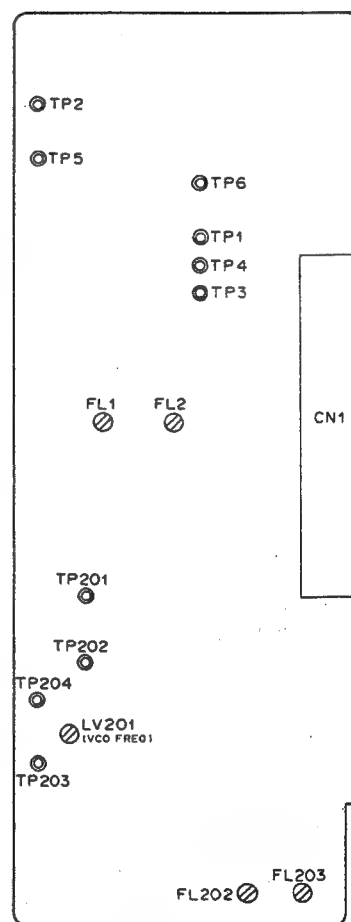
- Test point : TP3/VDA-11P
- Adj. point : ●RV5 (REF SYNC LEVEL)/VDA-11P
- Spec. : $A = 0.598 \pm 0.01V$



TRIG : INT



VDA-11P BOARD (SOLDERING SIDE)



VDA-11P BOARD (COMPONENT SIDE)

8-5-6. C REF Sync Trapezoid Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

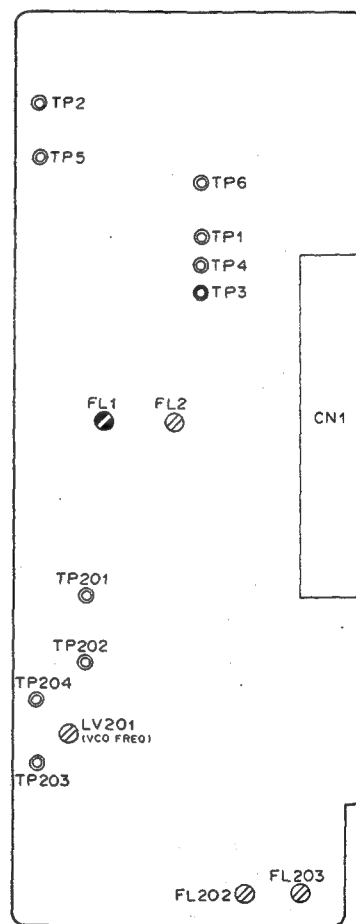
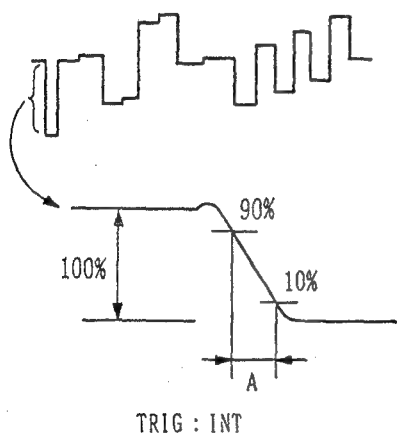
Board: VDA-11P board

• Preparation

- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP3/VDA-11P
- Adj. point : ●FL1/VDA-11P
- Spec. : $A = 220 \pm 20 \text{ nsec}$



VDA-11P BOARD (COMPONENT SIDE)

C VTD SYSTEM ALIGNMENT IIIIIIIIIII

8-5-7. ID Pulse Level Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

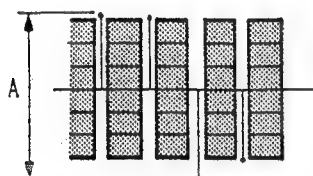
Board: VDA-11P board

• Preparation

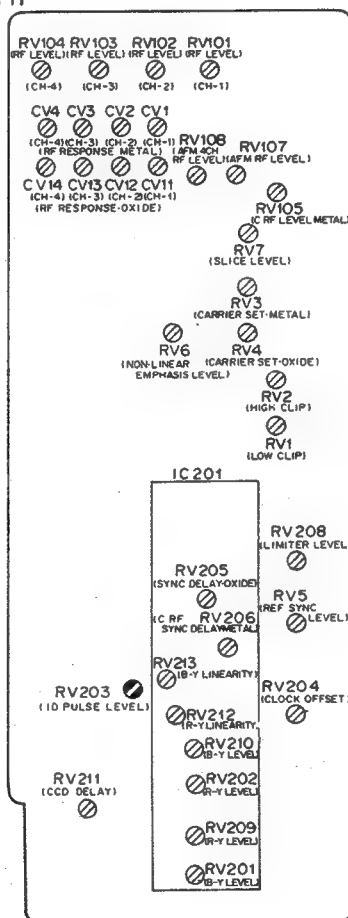
- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

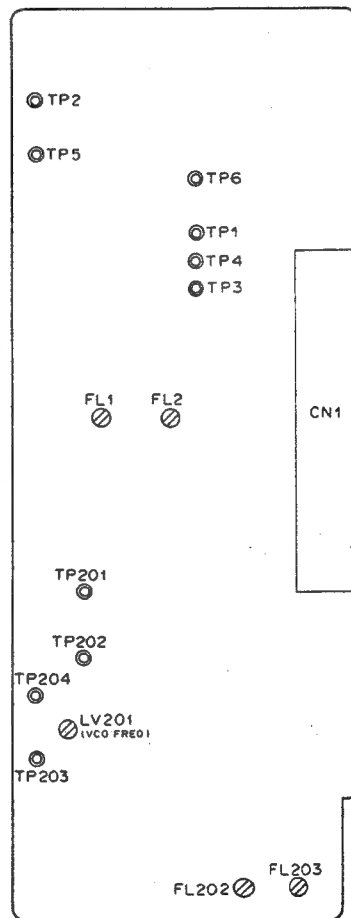
- Test point : TP3/VDA-11P
- Adj. point : $\textcircled{RV203}$ (ID PULSE LEVEL)/VDA-11P
- Spec. : $A=0.5\pm0.05$ V



TRIG : TP8/EXT BOARD



VDA-11P BOARD (SOLDERING SIDE)



VDA-11P BOARD (COMPONENT SIDE)

8-5-8. C Carrier/Deviation Adjustment

1) Adjustment using Spectrum Analyzer

Step.1

• Setting

Equipment: Spectrum Analyzer

Board: VDA-11P board

• Preparation

- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

• Test point: TP5/VDA-11P

• Adj. point : Carrier adjustment

●RV3

(CARRIER SET METAL)/VDA-11P.

Deviation adjustment

●RV1/VDA-11P (IC 2)

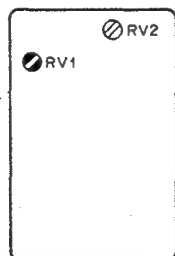
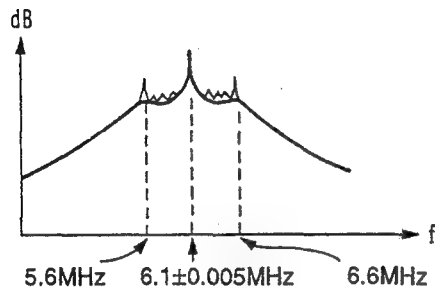
: Carrier adjustment

: Deviation adjustment

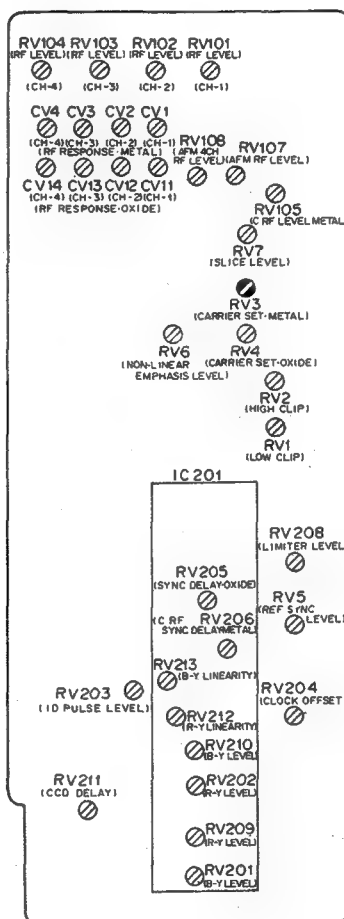
Set the center peak level to 5.3MHz.

Set the gap between the two peaks

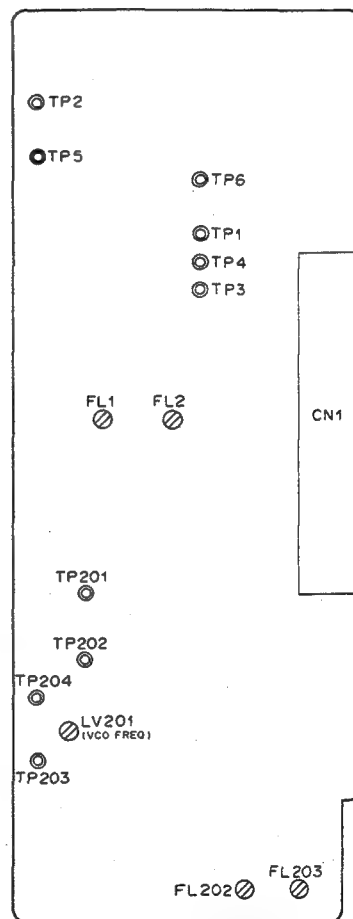
(4.8MHz and 5.8MHz) to 1MHz.



H1C (IC2)
(COMPONENT SIDE)
- On the VDA-11P Board -



VDA-11P BOARD (SOLDERING SIDE)



VDA-11P BOARD (COMPONENT SIDE)

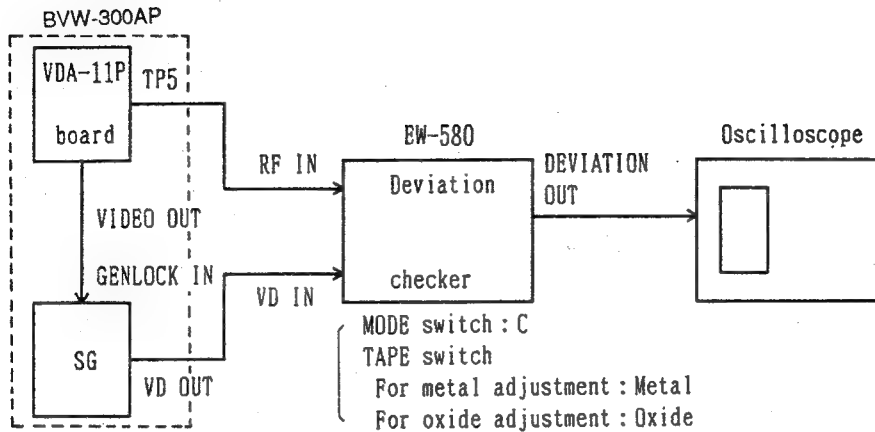
R VTR SYSTEM ALIGNMENT

2) Adjustment using Deviation Checker

• Setting

Equipment: Dualtrace Oscilloscope	Board: VDA-11P board
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• Connection

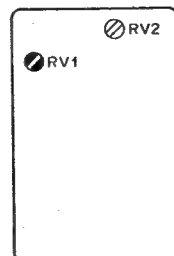
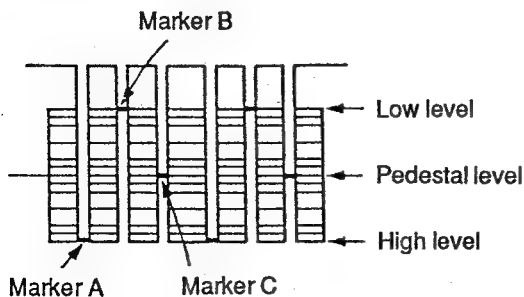


• Preparation

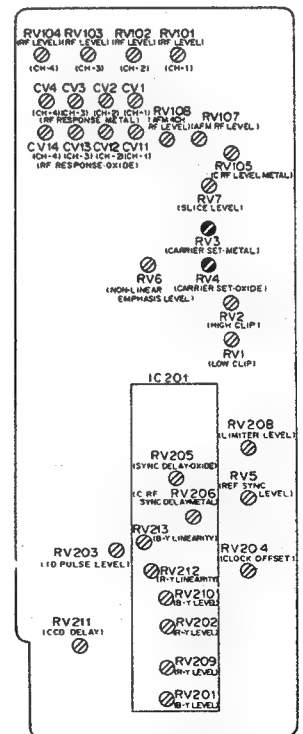
- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.
- After metal adjustment is completed, insert the BCT-20G and put the unit into the REC mode.

• Adjustment procedures

- Test point : DEVIATION OUT (DEVIATION CHECKER)
- Adj. point : • METAL
 - Marker C adjustment (Carrier setting)
 - RV3 (CARRIER SET)/VDA-11P
 - Marker A and B adjustment (deviation)
 - RV1/VDA-11P (IC2)
- OXIDE
 - Marker C Adjustment (Carrier setting)
 - RV4 (CARRIER SET)/VDA-11P
- Spec. : Procedure
 1. Set marker C to the pedestal level.
 2. Set marker A to the high level and marker B to the low level.
 3. Set oxide marker C to the pedestal level.



HIC (IC2)
(COMPONENT SIDE)
— On the VDA-11P Board —



VDA-11P BOARD (SOLDERING SIDE)

Step 2

• Setting

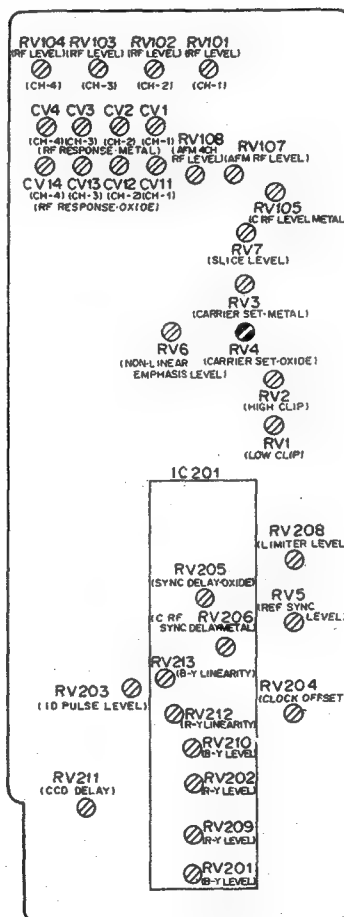
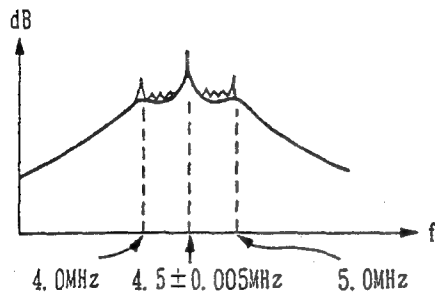
Equipment: Spectrum Analyzer	Board: VDA-11P board
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• Preparation

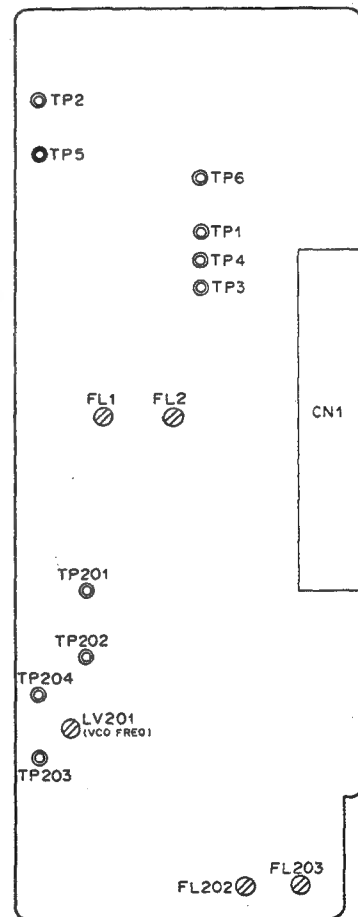
- built-in color-bar
- Insert the BCT-20G and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP5/VDA-11P
- Adj. point : Carrier adjustment
 ●RV4
 (CARRIER SET OXIDE)
 /VDA-11P
- Spec. : Carrier adjustment
 Set the center peak level to 4.5MHz.



VDA-11P BOARD (SOLDERING SIDE)



VDA-11P BOARD (COMPONENT SIDE)

8-5-9. C Low Clip Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

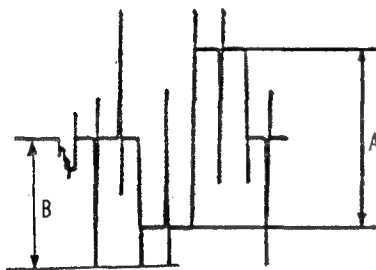
Board: VDA-11P board

• Preparation

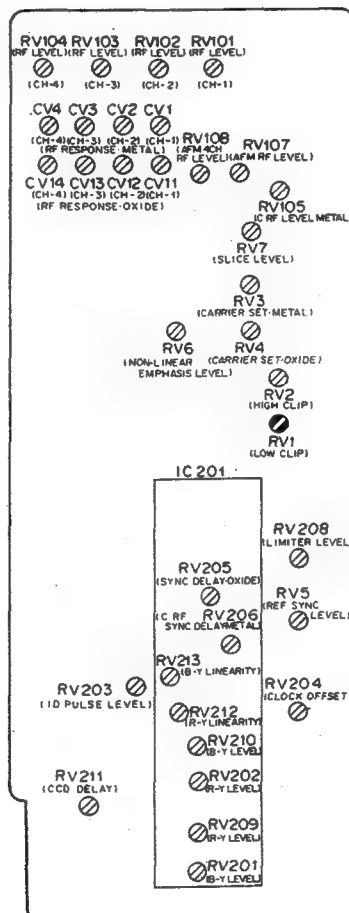
- Input signal: pulse & bar (3T, 2T)
- Insert the BCT-20G and put the unit into the REC mode.

• Adjustment procedures

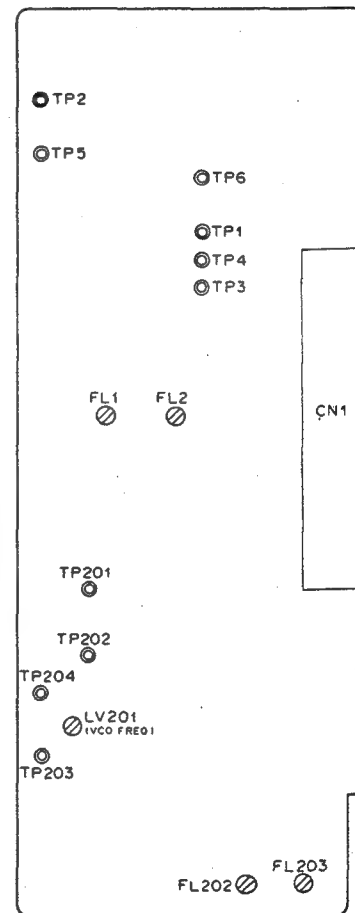
- Test point : TP2/VDA-11P
- Adj. point : ●RV1 (LOW CLIP)
/VDA-11P
- Spec. : A = R-Y/B-Y level
B = $A \times 130 \pm 5\%$



TRIG : HD/SG



VDA-11P BOARD (SOLDERING SIDE)



VDA-11P BOARD (COMPONENT SIDE)

8-5-10. C High Clip Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

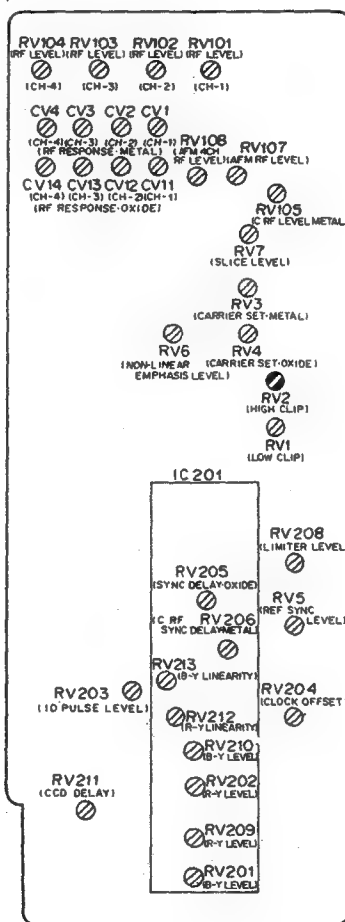
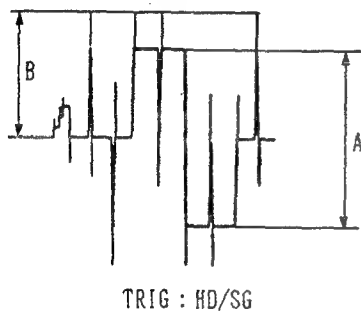
Board: VDA-11P board

• Preparation

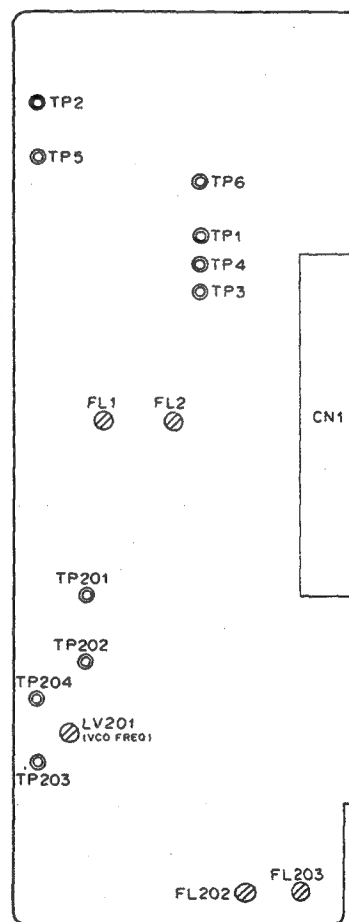
- Input signal: pulse & bar (3T, 2T)
- Insert the BCT-20M and put the unit into the REC mode.
- After level A is measured, set the chroma level to +6dB and adjust level B.

• Adjustment procedures

- Test point : TP2/VDA-11P
- Adj. point : ●RV2 (HIGH CLIP)
/VDA-11P
- Spec. : A= R-Y/B-Y level
B= $A \times 285 \pm 5\%$



VDA-11P BOARD (SOLDERING SIDE)



VDA-11P BOARD (COMPONENT SIDE)

• Note

- If the chroma level of the signal generator can not be +6dB, remove the R-Y, B-Y terminated resistors R3 and R4 on the Video Signal Input Board (EW-573) temporarily and perform the adjustment.

8-5-11. C Nonlinear Emphasis Level Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

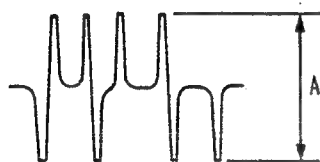
Board: VDA-11P board

• Preparation

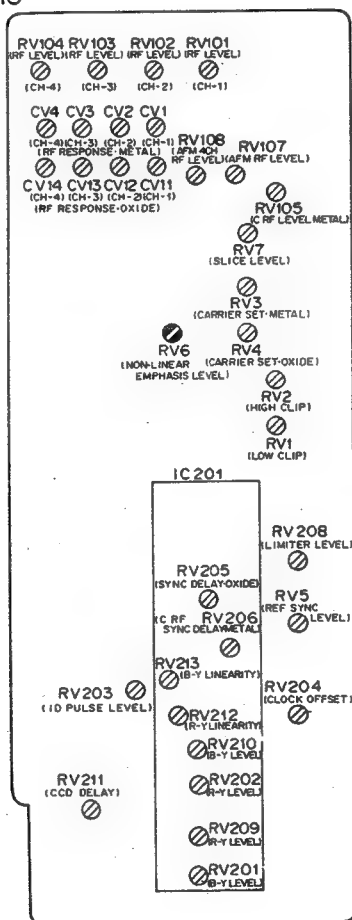
- Input signal: pulse & bar (3T, 2T)
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

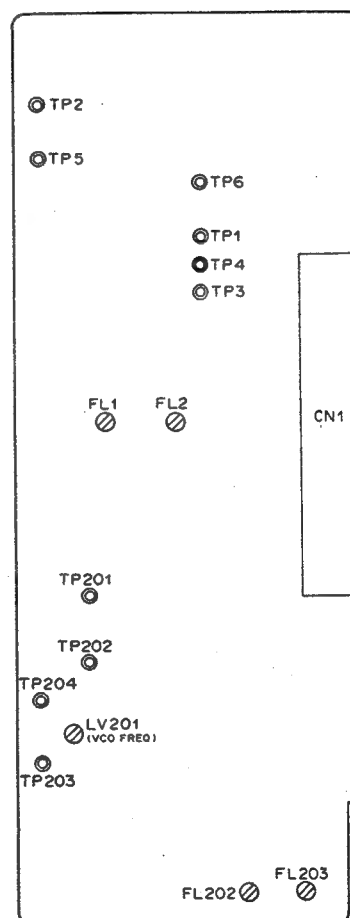
- Test point : TP4/VDA-11P
- Adj. point : \odot RV6 (NON-LINEAR EMPHASIS LEVEL)/VDA-11P
- Spec. : $A=76\pm 2\text{mV}$



TRIG : HD/SG



VDA-11P BOARD (SOLDERING SIDE)



VDA-11P BOARD (COMPONENT SIDE)

8-5-12. C REC HF Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

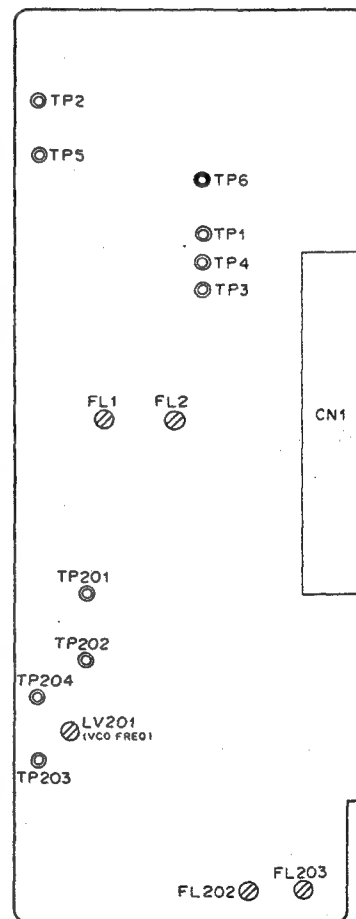
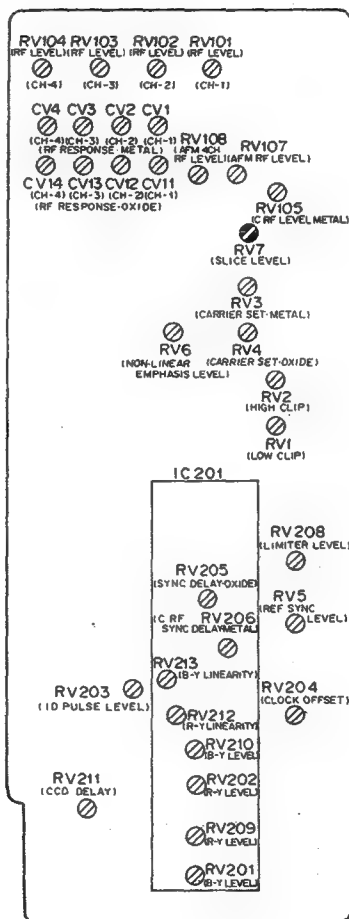
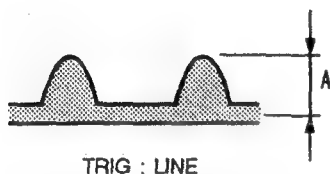
Board: VDA-11P board

• Preparation

- Y, B-Y input signal: 0% flat field
- R-Y input signal: H sweep (For only RF, 1Vp-p/75ohms) TP-39/Extention board.
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP6/VDA-11P
- Adj. point : RV7 (SLICE LEVEL)/VDA-11P
- Spec. : $A=60\pm 2\text{mVp-p}$
(Measured at the waveform center.)



8-5-13. C MOD Carrier Balance Adjustment

• Setting

Equipment: Spectrum Analyzer

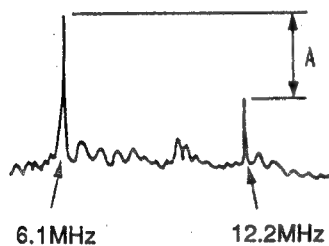
Board: VDA-11P board

• Preparation

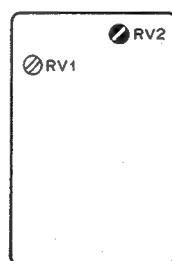
- Input signal: 0% flat field
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

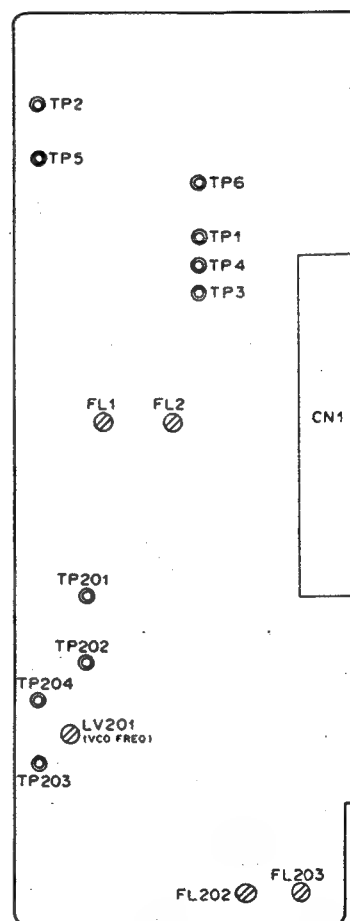
- Test point : TP5/VDA-11P
- Adj. point : RV2/VDA-11P (IC2)
- Spec. : Minimize the level at 10.6MHz.
(A=40dB or more)



TRIG : INT



HIC (IC2)
(COMPONENT SIDE)
- On the VDA-11P Board -



VDA-11P BOARD (COMPONENT SIDE)

8-5-14. Y Input Level Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

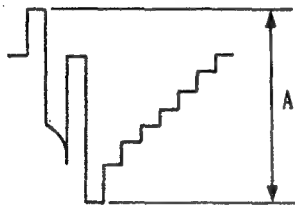
Board: AFM-6P board

• Preparation

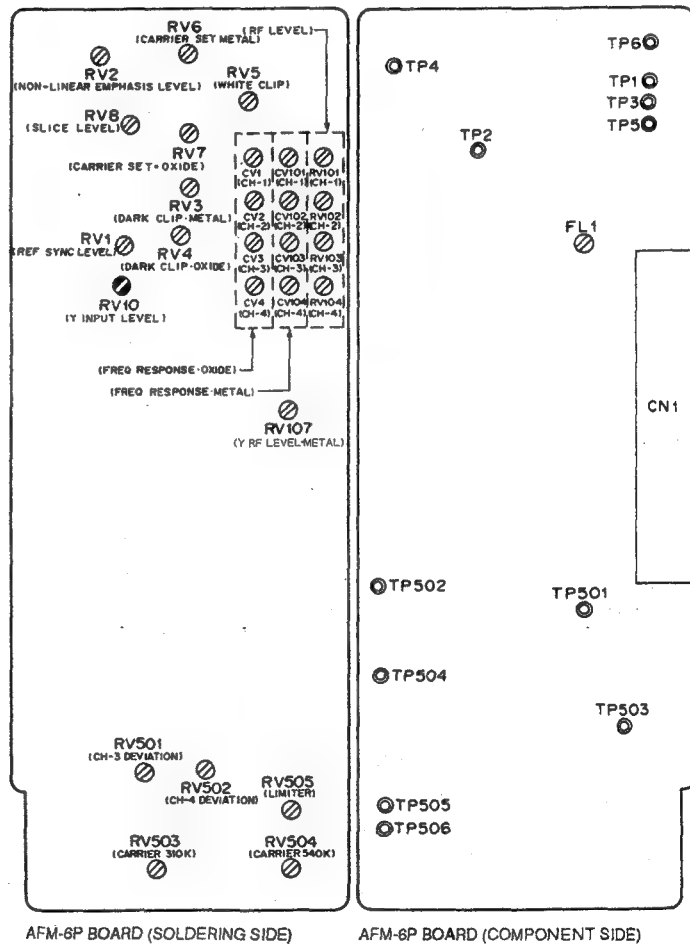
- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP5/AFM-6P
- Adj. point : ●RV10 (Y INPUT LEVEL)/
AFM-6P
- Spec. : $A=1.0\pm0.02V$



TRIG : INT



0 VTD SYSTEM ALIGNMENT IIIIIIIIIII

8-5-15. Y REF Sync Level Adjustment

• Setting

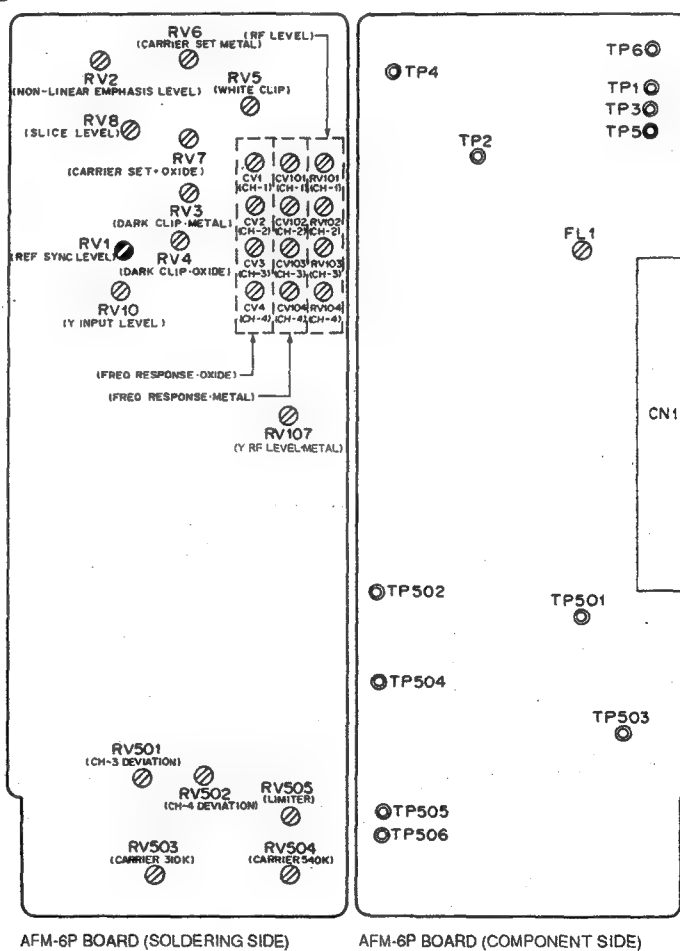
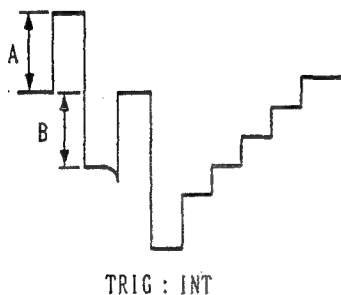
Equipment: Dualtrace Oscilloscope	Board: AFM-6P board
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• Preparation

- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP5/AFM-6P
- Adj. point : ●RV1 (REF SYNC LEVEL)/AFM-6P
- Spec. : A:B=100:125±2.5%



8-5-16. Y REF Sync Slant Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

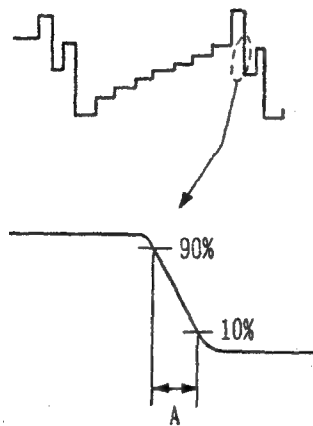
Board: AFM-6P board

• Preparation

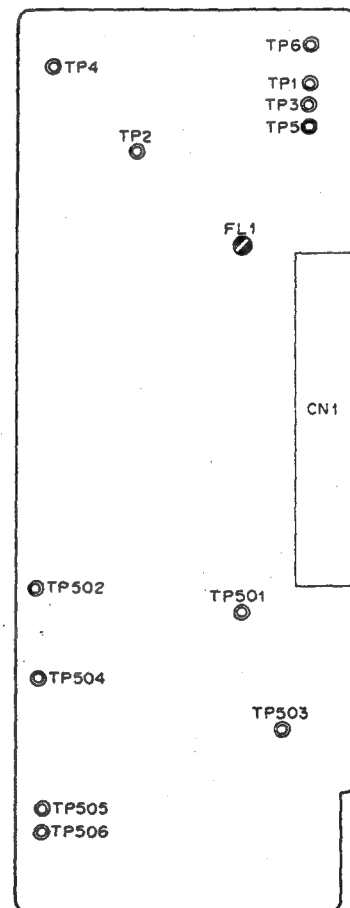
- Built-in-color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP5/AFM-6P
- Adj. point : FL1/AFM-6P
- Spec. : $A=180\pm 20\text{nsec}$



TRIG : INT



AFM-6P BOARD (COMPONENT SIDE)

8-5-17. Y Carrier/Deviation Adjustment

1) Adjustment using Spectrum Analyzer

Step 1

• Setting

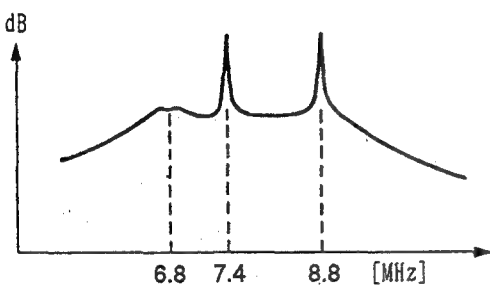
Equipment: Spectrum Analyzer	Board: AFM-6P board
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• Preparation

<ul style="list-style-type: none"> • Input signal: Color-bar • Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

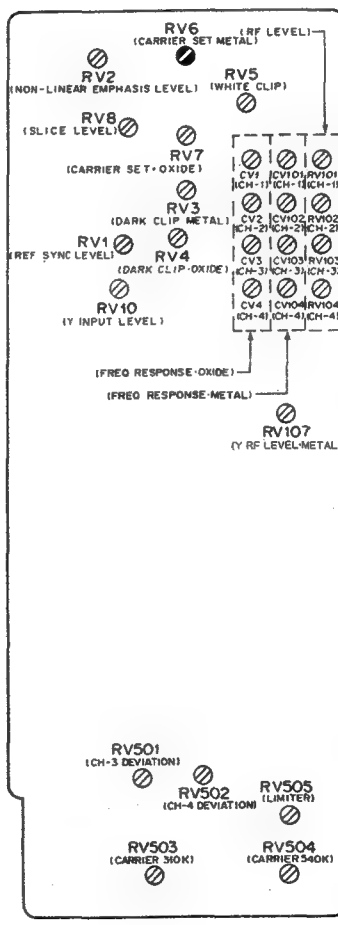
- Test point : TP4/AFM-6P
- Adj. point : Sync tip carrier adjustment
 ●RV6 (CARRIER SET METAL)/
 AFM-6P
- Spec. : Deviation adjustment
 ●RV1/AFM-6P (IC1)
- Spec. : Sync tip carrier adjustment
 Set the left side peak level to 5.7MHz.
- Spec. : Deviation adjustment
 Set the gap between two peaks to 1.4MHz.



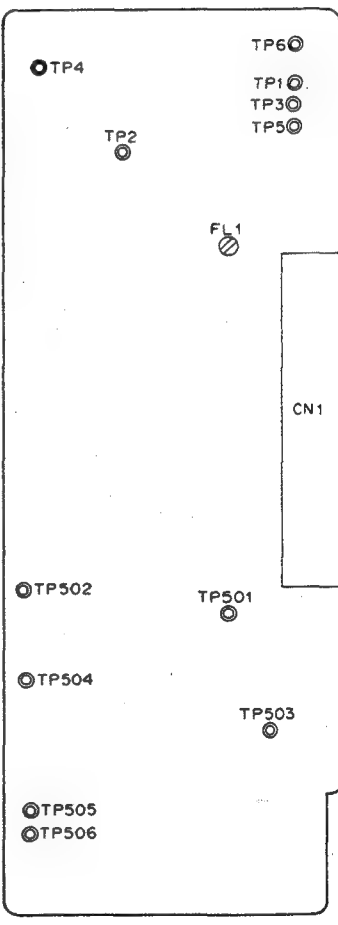
●RV1

●RV2

HIC (IC1)
 (COMPONENT SIDE)
 - On the AFM-6P Board -



AFM-6P BOARD (SOLDERING SIDE)



AFM-6P BOARD (COMPONENT SIDE)

Step 2

• Setting

Equipment: Spectrum Analyzer

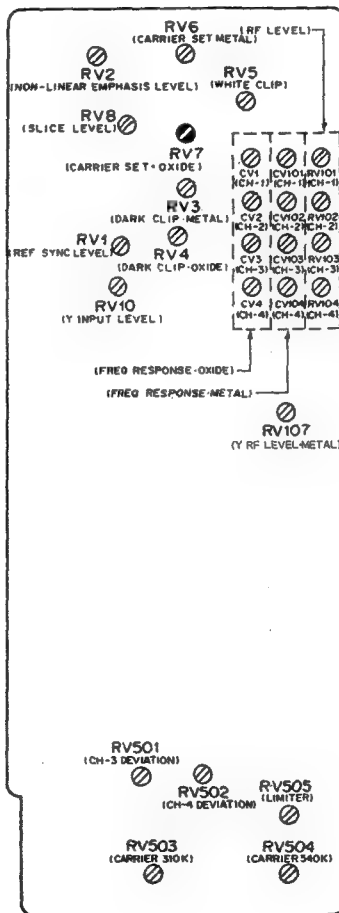
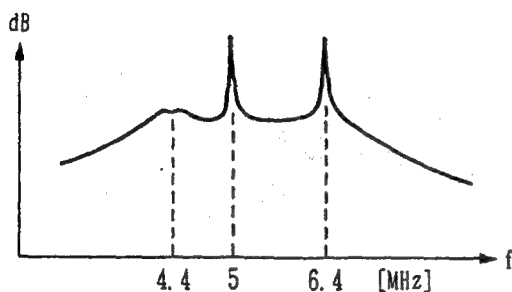
Board: AFM-6P board

• Preparation

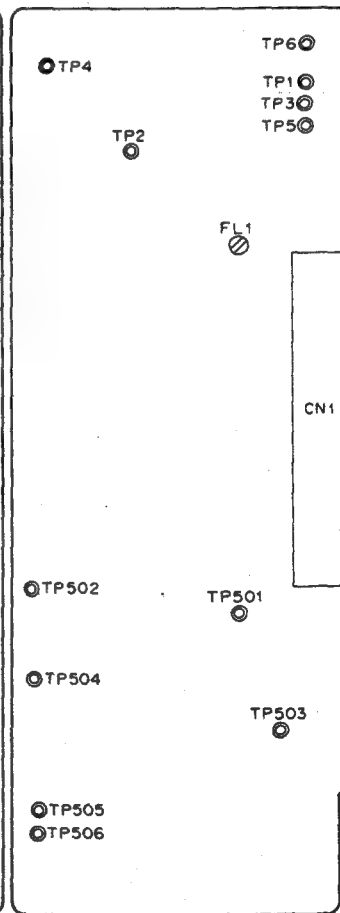
- Input signal: Color-bar
- Insert the BCT-20G and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP4/AFM-6P
- Adj. point : Sync tip carrier adjustment
 ● RV7 (CARRIER SET OXIDE)/AFM-6P
- Spec. : Sync tip carrier adjustment
 Set the left side peak level to 4.4 MHz.



AFM-6P BOARD (SOLDERING SIDE)



AFM-6P BOARD (COMPONENT SIDE)

2) Adjustment Using Deviation Checker

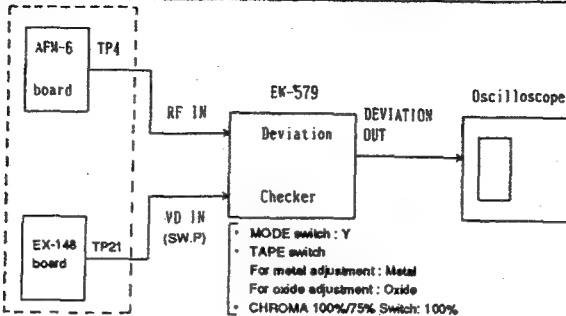
• Setting

Equipment: Dualtrace Oscilloscope

Board: AFM-6P board

• Connection

BVW-300AP

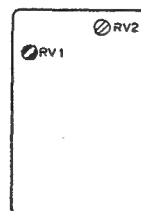
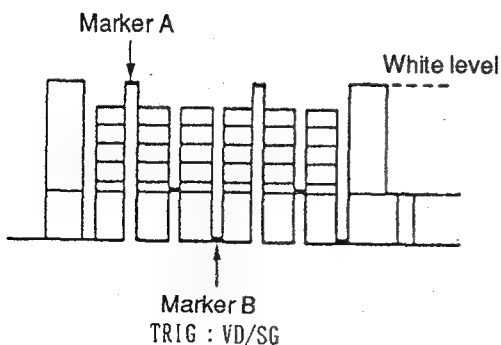


• Preparation

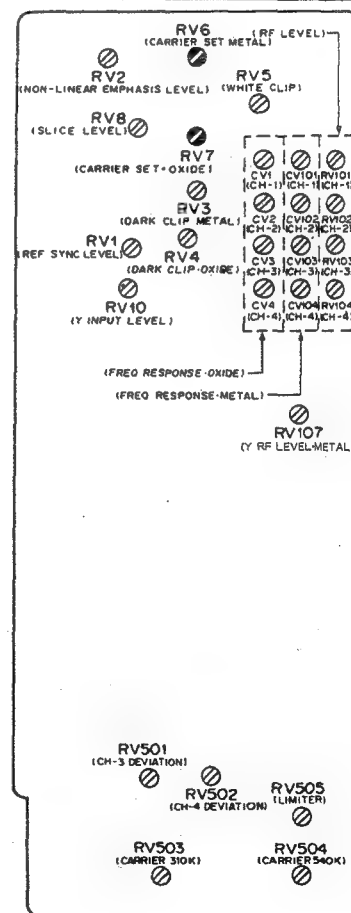
- Built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.
- After metal adjustment is completed, insert the BCT-20G and put the unit into the REC mode.

• Adjustment procedures

- Test point : DEVIATION OUT (DEVIATION CHECKER)
- Adj. point : METAL
Marker B adjustment (CARRIER SETTING)
● RV6 (CARRIER SET)/AFM-6P
Marker A adjustment (DEVIATION)
● RV1/AFM-6P (IC1)
: OXIDE
Marker B adjustment (CARRIER SETTING)
● RV7 (CARRIER SET) /AFM-6P
- Spec. : Procedure
1. Set marker B to the sync tip level.
2. Set marker A to the white peak level.
3. Set oxide marker B to the sync tip level.



HIC (IC1)
(COMPONENT SIDE)
- On the AFM-6P Board -



AFM-6P BOARD (SOLDERING SIDE)

8-5-18. Y Dark Clip Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

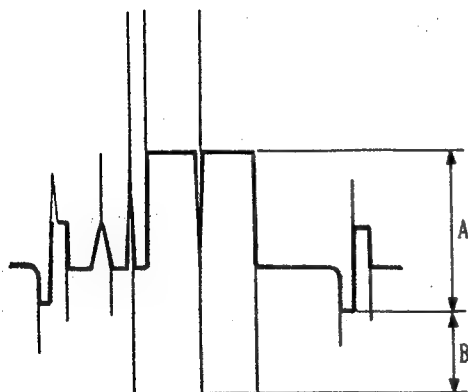
Board: AFM-6P board

• Preparation

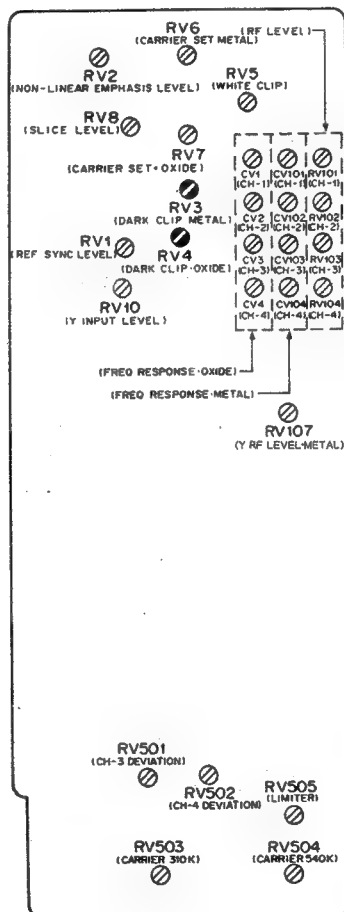
- Input signal: MOD pulse & bar
- Metal: Insert the BCT-20M and put the unit into the REC mode.
- Oxide: Insert the BCT-20G and put the unit into the REC mode.

• Adjustment procedures

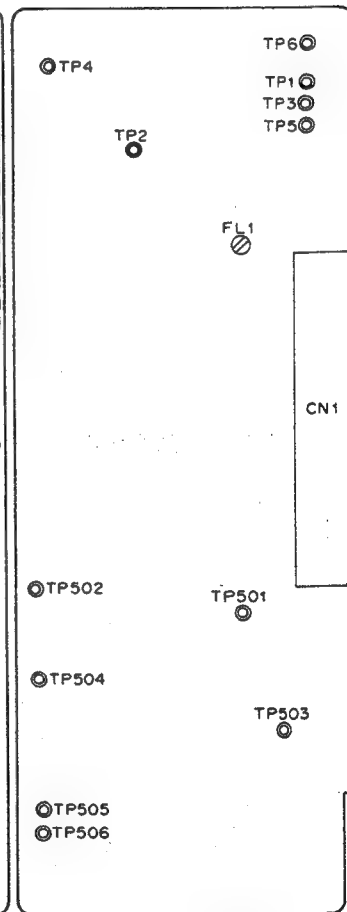
- Test point : TP2/AFM-6P
- Adj. point :
 - RV3 (DARK CLIP METAL) /AFM-6P
 - RV4 (DARK CLIP OXIDE) /AFM-6P
- Spec. :
 - B = $A \times 150 \pm 2.5\%$ (METAL)
 - B = $A \times 65 \pm 2.5\%$ (OXIDE)



TRIG : HD/SG



AFM-6P BOARD (SOLDERING SIDE)



AFM-6P BOARD (COMPONENT SIDE)

8-5-19. Y White Clip Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

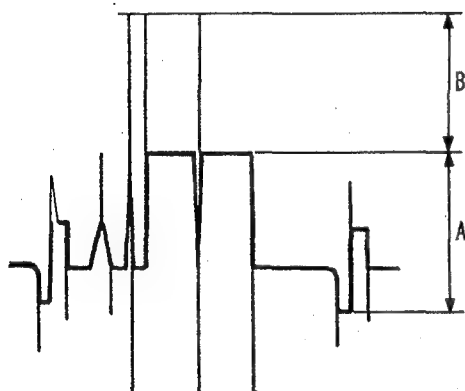
Board: AFM-6P board

• Preparation

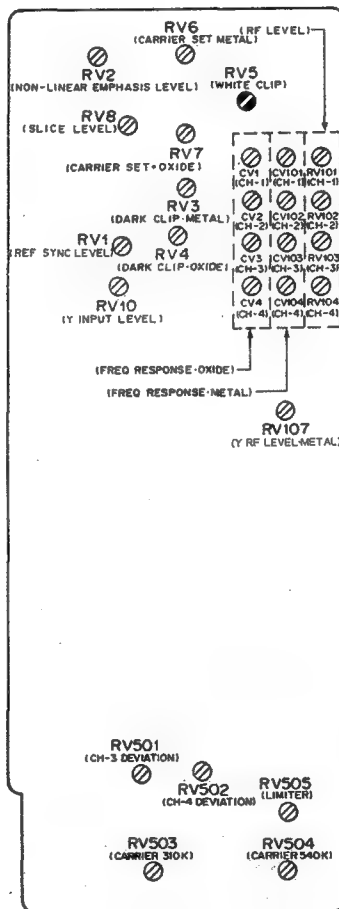
- Input signal: MOD pulse and bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

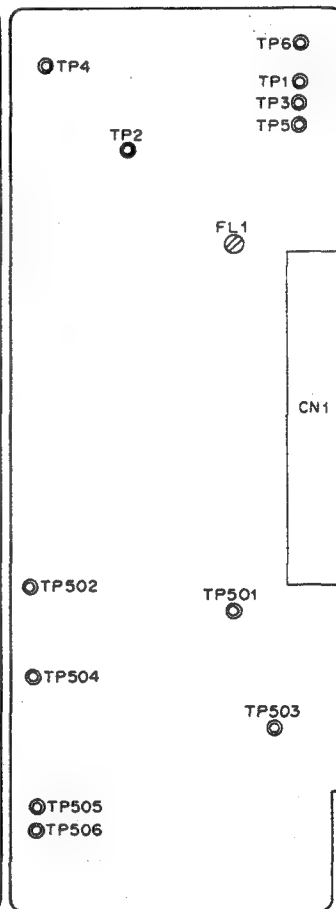
- Test point : TP2/AFM-6P
- Adj. point : ● RV5 (WHITE CLIP) /AFM-6P
- Spec. : A = VS level
B = $A \times 130 \pm 2.5\%$



TRIG : HD/SG



AFM-6P BOARD (SOLDERING SIDE)



AFM-6P BOARD (COMPONENT SIDE)

8-5-20. Y Nonlinear Emphasis Level Adjustment

• Setting

Equipment: Dualtrace Oscilloscope	Board: AFM-6P board
-----------------------------------	---------------------

• Preparation

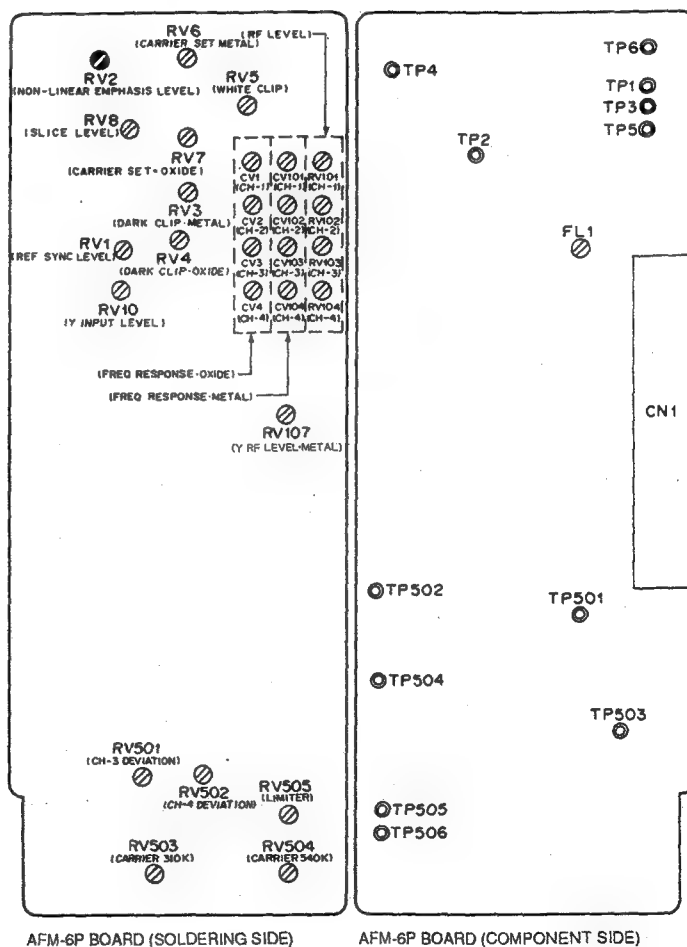
- Input signal: MOD pulse and bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP3/AFM-6P
- Adj. point : ● RV2 (NON-LINEAR EMPHASIS)/AFM-6P
- Spec. : $A = 90 \pm 2\text{mV}$



TRIG : HD/SG



8-5-21. Y REC HF Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

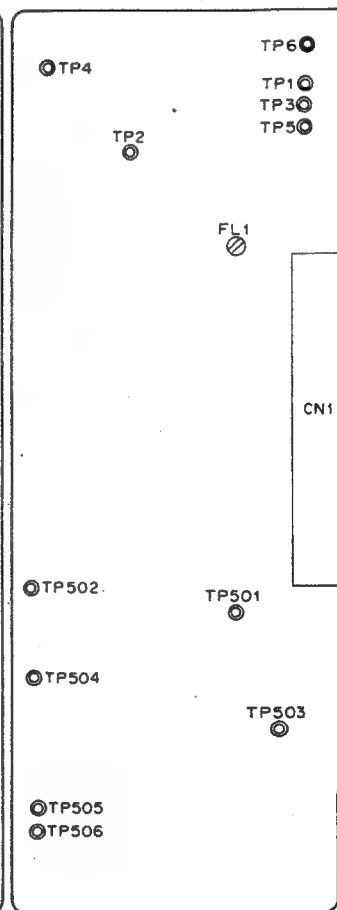
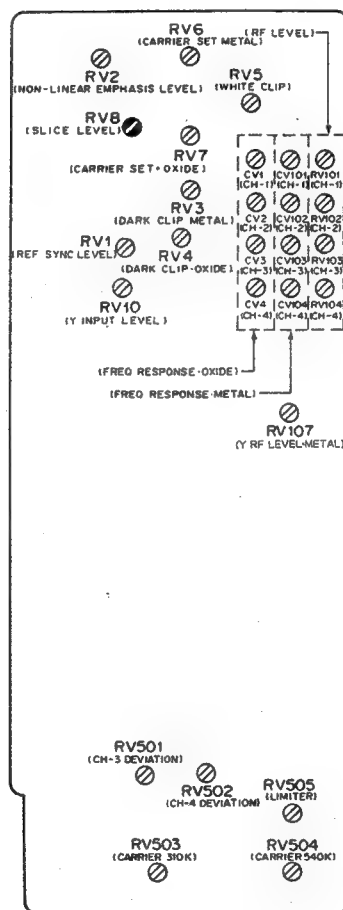
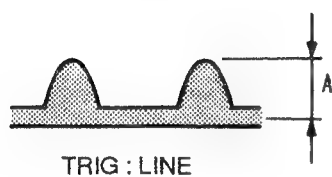
Board: AFM-6P board

• Preparation

- Y input signal: H sweep (Sweep signal 820mV and sync signal 285mV/75-ohms termination)
TP9/Extension board: AFM-6P
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP6/AFM-6P
- Adj. point : ● RV8 (SLICE LEVEL)/AFM-6P
- Spec. : $A = 150 \pm 5\text{mV}$
(Measured at the waveform center.)



8-5-22. Y MOD Carrier Balance Adjustment

- **Setting**

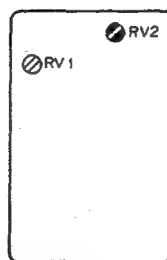
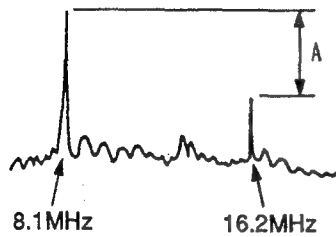
Equipment: Spectrum Analyzer	Board: AFM-6P board
------------------------------	---------------------

- Preparation

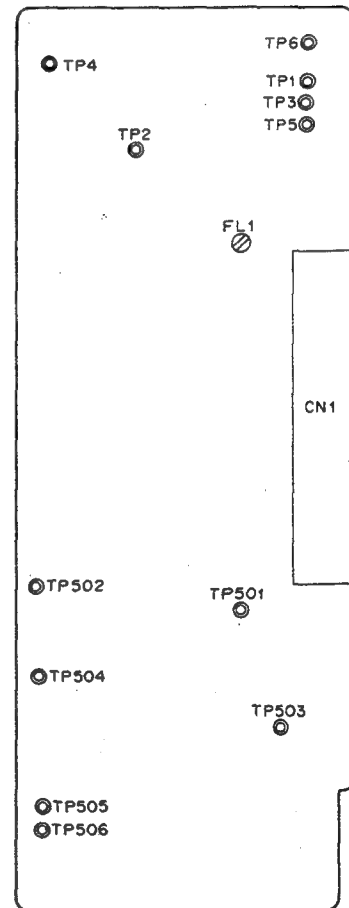
- Input signal: 50% flat field
- Insert the BCT-20M and put the unit into the REC mode.

- Adjustment procedures

- Test point : TP4/AFM-6P
- Adj. point : ● RV2/AFM-6P (IC1)
- Spec. : Minimize the level at 14MHz.
(A = 40dB or more)



HIC (IC1)
(COMPONENT SIDE)
- On the AFM-6P Board -



AFM-6P BOARD (COMPONENT SIDE)

8-5-23. Y REC Current Tentative Adjustment (Oxide)

• Setting

Equipment: Dualtrace Oscilloscope

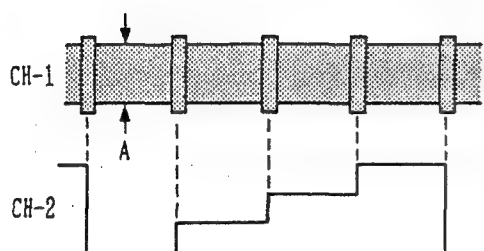
Board: AFM-6P board

• Preparation

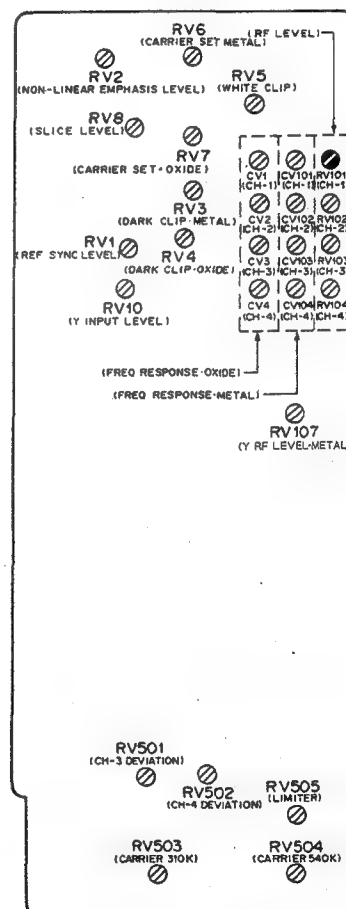
- Input signal: 50% flat field
- Insert the BCT-20G and put the unit into the REC mode.

• Adjustment procedures

- Test point : CH1: TP32/Extension board
CH2: TP7/Extension board
- Adj. point : ● RV101 (CH-1 RF LEVEL)
/AFM-6P
- Spec. : $A = 800 \pm 20\text{mV}$



TRIG : CH-2



AFM-6P BOARD (SOLDERING SIDE)

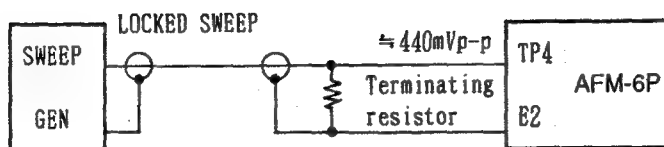
8-5-24. Y REC Current Frequency Response Adjustment (Oxide)

• Setting

Equipment: Dualtrace Oscilloscope

Board: AFM-6P board

• Connection



• Preparation

- Remove short-housing CNJ2 on the AFM-6P board, connect the Sweep Signal Generator between TP4 on the AFM-6P board and E2 on the AFM-6P board and supply a locked sweep signal.
- Insert the BCT-20G and put the unit into the REC PAUSE mode.
- After adjustment is completed, install short-housing CNJ2.

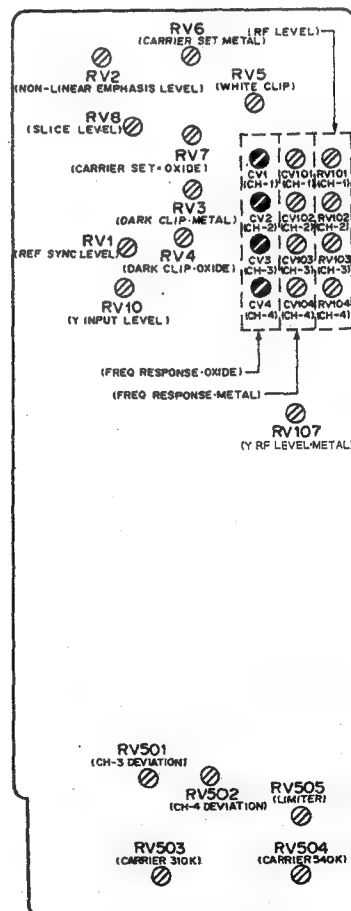
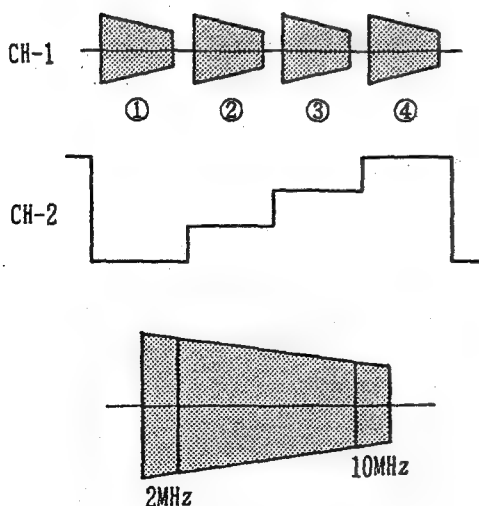
• Adjustment procedures

- Test point : CH-1 : TP32/Extension board
CH-2 : TP7/Extension board
- Adj. point : ① : CV1 (CH-1 FREQ RESP)/AFM-6P
② : CV2 (CH-2 FREQ RESP)/AFM-6P
③ : CV3 (CH-3 FREQ RESP)/AFM-6P
④ : CV4 (CH-4 FREQ RESP)/AFM-6P

• Spec.

frequency	level
2 MHz	100% reference
10 MHz	$90 \pm 5\%$

TRIG: TP7/Extension board



AFM-6P BOARD (SOLDERING SIDE)

8-5-25. Y REC Current Adjustment (Oxide)

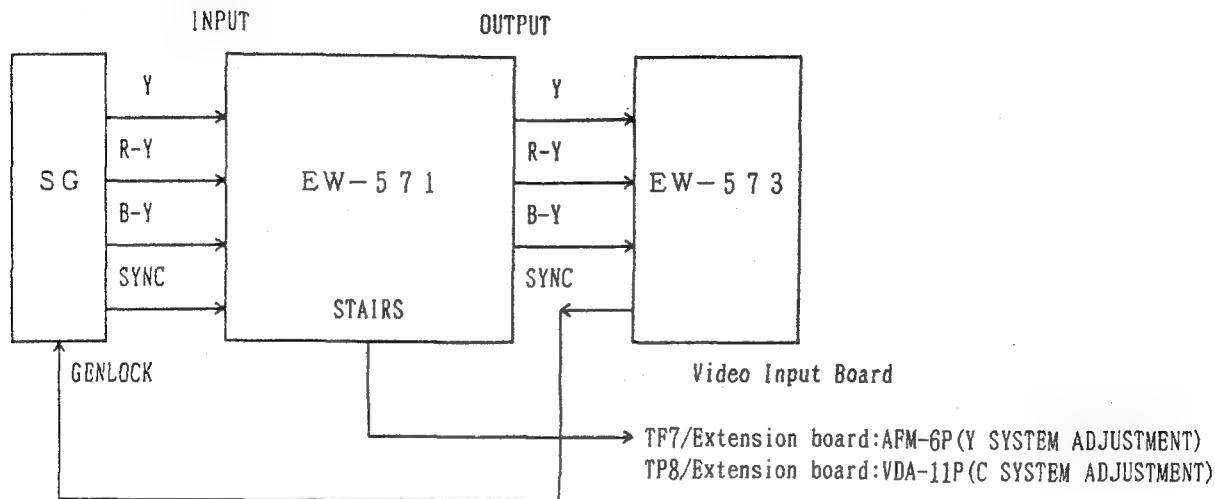
Step 1.

• Setting

Equipment: Dualtrace Oscilloscope	Board: AFM-6P board
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• Connection

REC CURRENT ADJ. TOOL

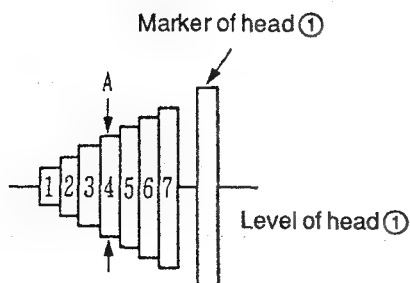


• Preparation

- Remove short-housing CNJ2 on the AFM-6P board and connect the RF OUT connector of the REC Current Adjustment Tool between TP4 on the AFM-6P board and E2 on the AFM-6P board.
- Insert the BCT-20G and put the unit into the REC PAUSE mode.
- Adjustment To II:
 AUTO/M ANU → AUTO
 NTSC/PAL → NTSC
 Y/C → Y
 METAL/OXIDE → OXIDE

• Adjustment procedures

- Test point : TP32/Extension board: AFM-6P
- Adj. point : RF LEVEL VR/REC CURRENT ADJUSTMENT TOOL
- Spec. : $A = 800 \pm 10\text{mV}$
(Fourth level)



Step 2.

• Setting

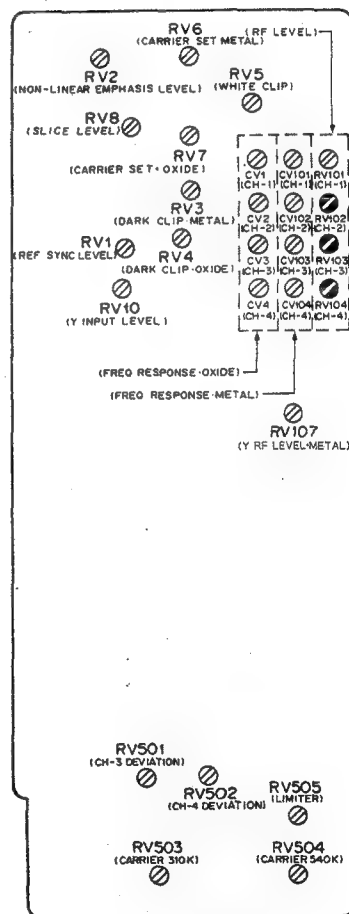
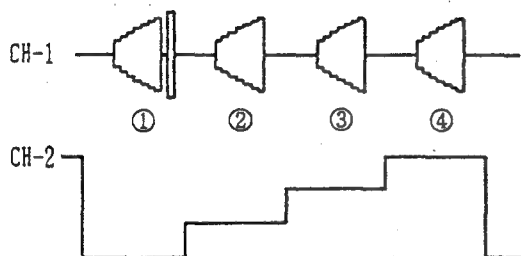
Equipment: Dualtrace Oscilloscope	Board: AFM-6P board
-----------------------------------	---------------------

• Preparation

- Adjust so that the specified level is the same as in Step 1.
- Put the unit into the REC mode and record the signal on the tape.

• Adjustment procedures

- Test point : CH-1 : TP32/Extension board
CH-2 : TP7/Extension board
- Adj. point : HEAD② : ● RV102 (CH-2 RF LEVEL)/AFM-6P
HEAD③ : ● RV103 (CH-3 RF LEVEL)/AFM-6P
HEAD④ : ● RV104 (CH-4 RF LEVEL)/AFM-6P
- Spec. :



AFM-6P BOARD (SOLDERING SIDE)

Step 3

• Setting

Equipment: Dualtrace Oscilloscope

Board: VP-24P board

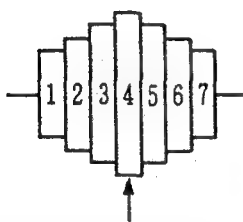
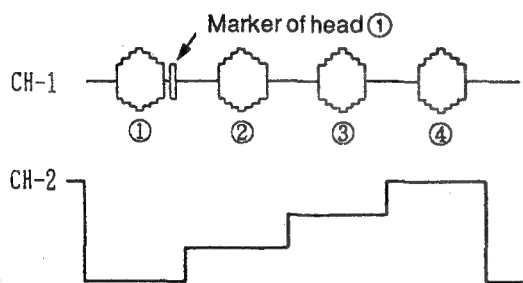
• Preparation

- Play back the recorded portion in step 2.
- Memorize the maximum level for every four heads (① through ④).

• Adjustment procedures

- Test point : CH-1 : TP33/Extension board :
VP-24P
CH-2 : TP25/Extension board :
VP-24P

• Spec: :



Check the maximum PB RF level.
* The illustrated fourth level is maximum.

• Note

- Remove a tool between TP4 and E2 and install short-housing CNJ2.

- Setting

Board: AFM-6P board

- Preparation

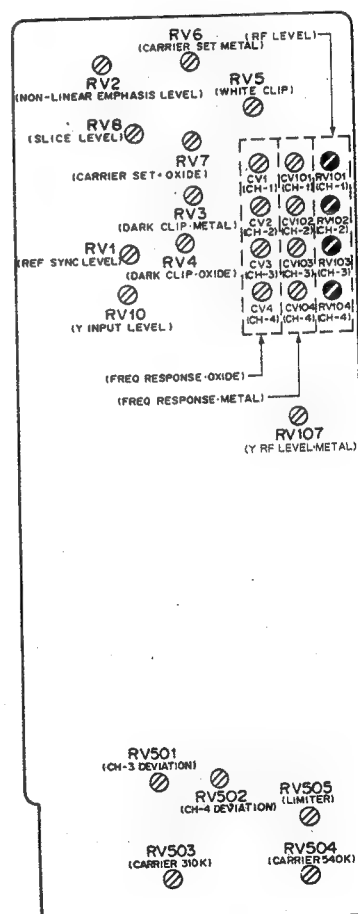
- Input signal: 50% flat field
- Insert the BCT-20G and put the unit into the REC mode.

- Adjustment procedures

-
- The diagram shows a continuous beam with four spans, labeled CH-1. The beam is supported by five vertical columns. Downward arrows are placed above each span, and upward arrows are placed below each span, labeled A, B, C, and D respectively. Below the beam, a stepped profile is shown, labeled CH-2. The profile consists of a series of horizontal segments at different heights, connected by vertical steps. The heights of the segments correspond to the spans of the beam above.

1	2	3	4	5	6	7
630	690	750	800	865	930	980

(mVp-p)



AFM-6P BOARD (SOLDERING SIDE)

8-5-26. Y Frequency Response Check (Oxide)

• Setting

Equipment: Dualtrace Oscilloscope	Board:
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• Preparation

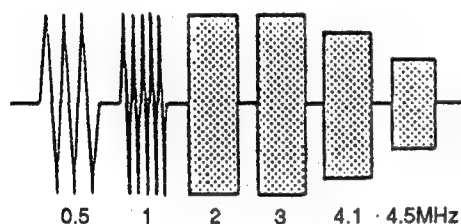
- Calculate the calibration value on the standard player (equivalent to BVW-75P).
Calibration Value = (Chart 1) - (CR5-2APS playback level)
- Playback the randomly recorded portions using the standard player BVW-300AP.

1 MHz	100 %
2 MHz	98 %
3 MHz	90 %
4.1 MHz	73 %

Chart 1

• Adjustment procedures

CAV Y OUT/BVW-75P (or equivalent)



FREQUENCY	LEVEL
0.5MHz	100% (REFERENCE)
1MHz	(100-Calibration value)±5%
2MHz	(98-Calibration value) ⁺⁵ _{-7.5} %
3MHz	(90-Calibration value) ⁺⁵ ₋₁₀ %
4.1MHz	(73-Calibration value) ⁺⁵ ₋₁₈ %

Measure the levels at the center of moire.

The level difference between the CH-1 and the CH-2 should be in the 5% or the less.

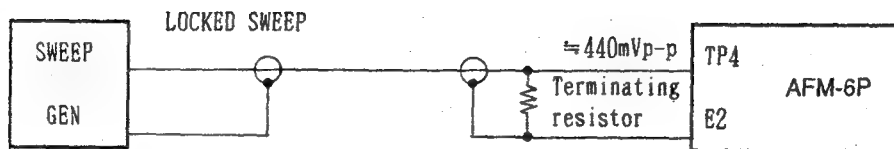
When the specification is not satisfied, re-adjust the Y recording current frequency response adjustment (Oxide) within the specification. After the adjustment, perform the Y recording current adjustment (Oxide).

8-5-27. Y REC Current Frequency Response Adjustment (Metal)

• Setting

Equipment: Dualtrace Oscilloscope	Board: AFM-6P board
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• Connection



• Preparation

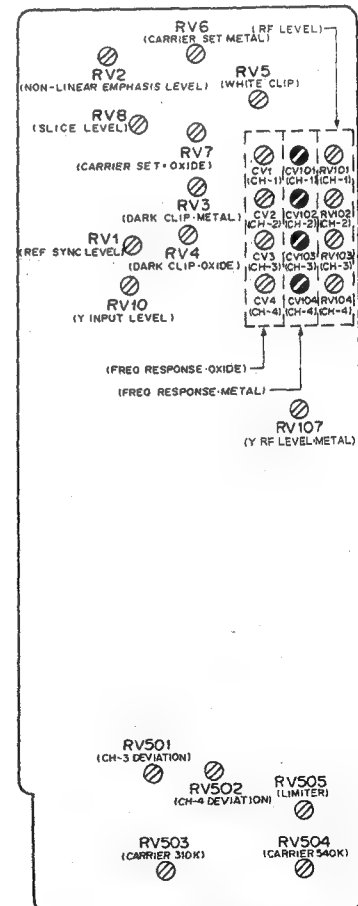
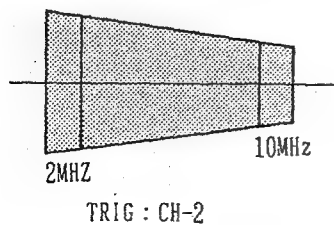
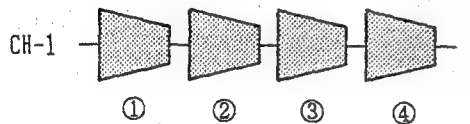
- Remove short-housing CNJ2 on the AFM-6P board, connect the Sweep Signal Generator between TP4 on the AFM-6P board and E2 on the AFM-6 board, and supply a locked sweep signal.
- Insert the BCT-20M and put the unit into the REC mode.
- After adjustment is completed, install short-housing CNJ2.

• Adjustment procedures

- Test point : CH-1 : TP32/Extension board
CH-2 : TP7/Extension board
- Adj. point : ① ● CV101 (CH-1 FREQ RESP)/AFM-6P
② ● CV102 (CH-2 FREQ RESP)/AFM-6P
③ ● CV103 (CH-3 FREQ RESP)/AFM-6P
④ ● CV104 (CH-4 FREQ RESP)/AFM-6P

• Spec.

frequency	level
2 MHz	100% reference
10 MHz	95 \pm 5 %



AFM-6P BOARD (SOLDERING SIDE)

8-5-28. Y REC Current Adjustment (Metal)

• Setting

Equipment: Dualtrace Oscilloscope

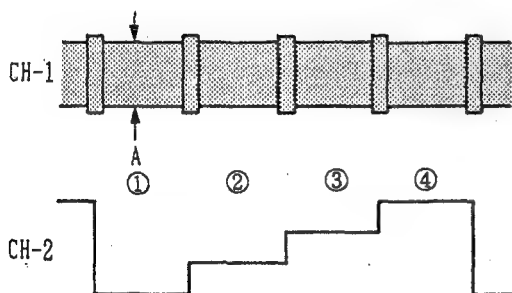
Board: AFM-6P board

• Preparation

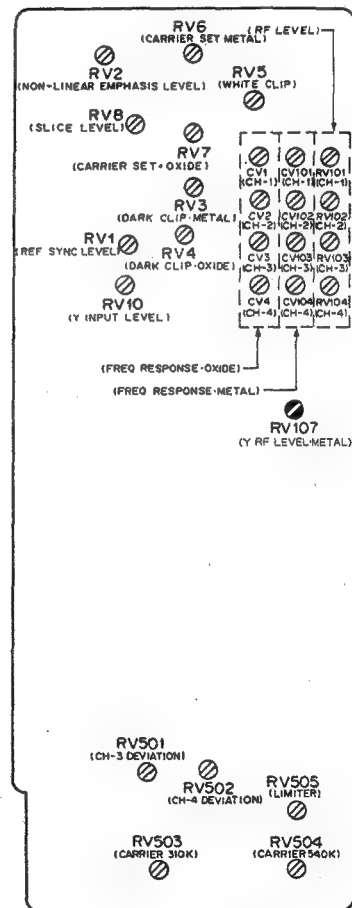
- Input signal: 50% flat field
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : CH-1 : TP32/Extension board
CH-2 : TP7/Extension board
- Adj. point : ● RV107 (Y RF LEVEL)/AFM-6P
- Spec. : Adjust so that A is two times as high as the level of head ① which is set in Step 4 of Sec. 8-5-25. Y REC Current Adjustment (Oxide).



The each level of the head ① through ④ should be less than 1.6V.



AFM-6P BOARD (SOLDERING SIDE)

8-5-29. Y Frequency Response Check (Metal)

• Setting

Equipment: Dualtrace Oscilloscope	Board:
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• Preparation

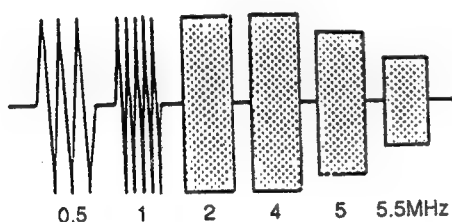
- Calculate the calibration value on the standard player (equivalent to BVW-75P).
Calibration Value = (Chart 1) - (CR5-1BPS playback level)
- Playback the randomly recorded portions using the standard player BVW-300AP.

1 MHz	100 %
2 MHz	100 %
4 MHz	100 %
5 MHz	100 %
5.5 MHz	80 %

Chart 1

• Adjustment procedures

CAV Y OUT/BVW-75P (or equivalent)



FREQUENCY	LEVEL
0.5MHz	100% (REFERENCE)
1MHz	(100-Calibration value) $\pm 5\%$
2MHz	(100-Calibration value) $\pm 5\%$
4MHz	(100-Calibration value) $^{+2.5}_{-7.5}\%$
5MHz	(100-Calibration value) $^{+5}_{-7.5}\%$
5.5MHz	(85-Calibration value) $^{+10}_{-15}\%$

Measure the levels at the center of moire.

The level difference between the CH-1 and the CH-2 should be in the 5% or the less.

When the specification is not satisfied, re-adjust the Y recording current frequency response adjustment (Metal) within the specification. After the adjustment, perform the Y recording current adjustment (Metal).

8-5-30. C REC Current Tentative Adjustment (Oxide)

• Setting

Equipment: Dualtrace Oscilloscope	Board: VDA-11P board
-----------------------------------	----------------------

• Preparation

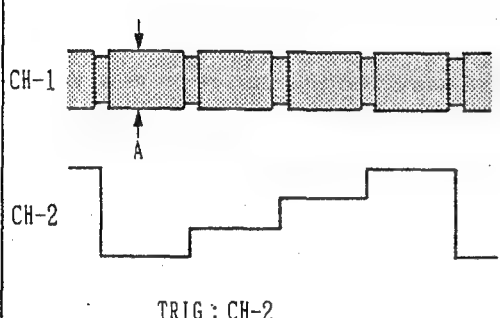
- Input signal: 0% flat field
- Insert the BCT-20G and put the unit into the REC mode.

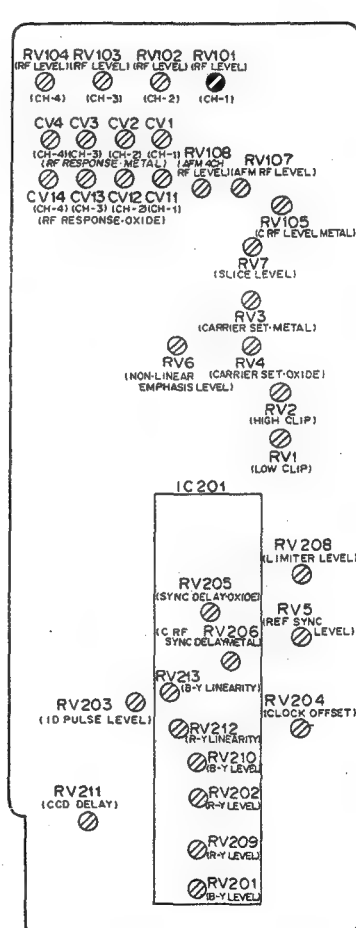
• Adjustment procedures

• Test point : CH-1 : TP46/Extension board
CH-2 : TP8/Extension board

• Adj. point : \odot RV101 (CH-1 RF LEVEL)
VDA-11P

• Spec. : $A = 400 \pm 10 \text{ mV}$





VDA-11P BOARD (SOLDERING SIDE)

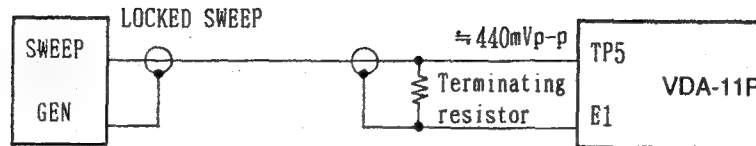
8-5-31. C REC Current Frequency Response Adjustment (Oxide)

• Setting

Equipment: Dualtrace Oscilloscope

Board: VDA-11P board

• Connection



• Preparation

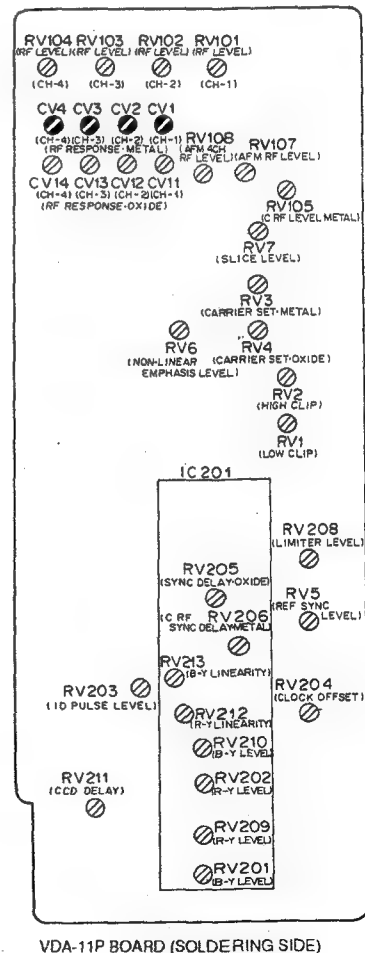
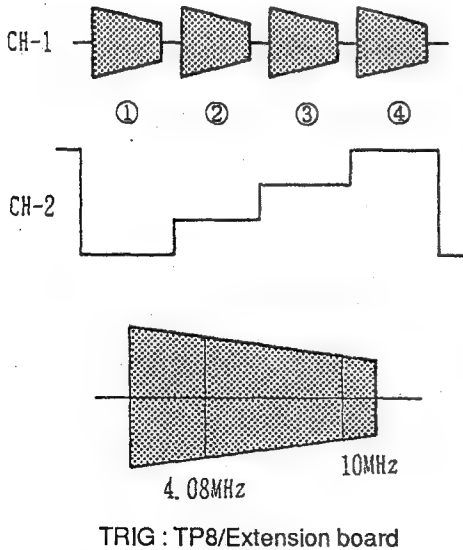
- Remove short-housing CNJ2 on the VDA-11P board, connect the Sweep Signal Generator between TP5 on the VDA-11P board and E1 on the VDA-11P board, and supply a locked sweep signal.
- Insert the BCT-20G and put the unit into the REC PAUSE mode.

• Adjustment procedures

- Test point : CH-1 : TP46/Extension board
CH-2 : TP8/Extension board
- Adj. point : CH-1 : ● CV1 (CH-1 RF RESP)/VDA-11P
CH-2 : ● CV2 (CH-2 RF RESP)/VDA-11P
CH-3 : ● CV3 (CH-3 RF RESP)/VDA-11P
CH-4 : ● CV4 (CH-4 RF RESP)/VDA-11P

• Spec.

frequency	level
3.93 MHz	100% reference
10 MHz	60 \pm 10%



• Note

- After adjustment is completed, install short-housing CNJ2.

8-5-32. C REC Current Adjustment (Oxide)

Step 1.

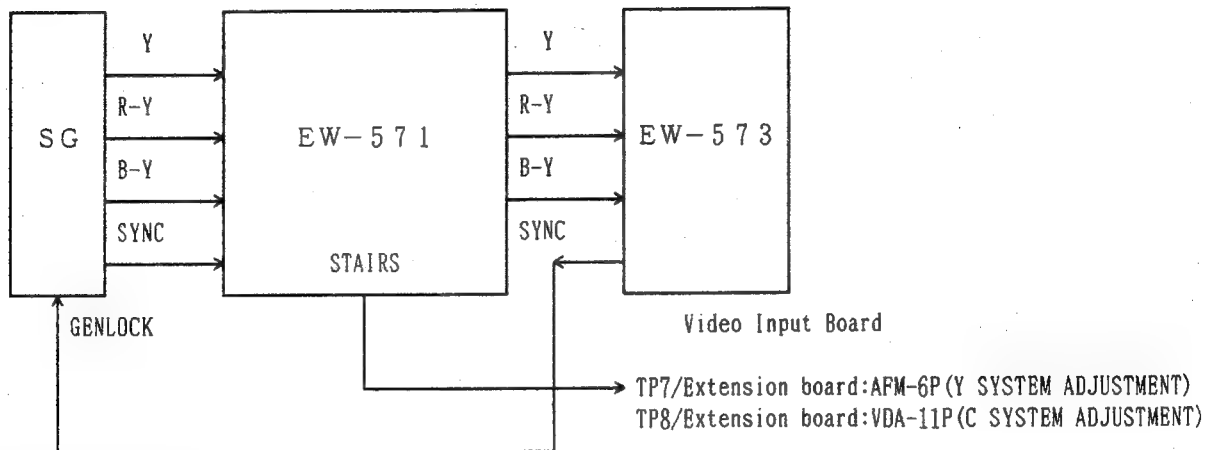
• Setting

Equipment: Dualtrace Oscilloscope	Board: VDA-11P board
-----------------------------------	----------------------

• Connection

REC CURRENT ADJ. TOOL INPUT

OUTPUT

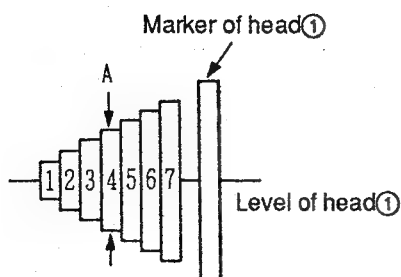


• Preparation

- Remove short-housing CNJ2 on the VDA-11P board and connect the RF OUT connector of the REC Current Adjustment Tool between TP5 on the VDA-11P board and E1 on the VDA-11P board.
- Insert the BCT-20K and put the unit into the REC PAUSE mode.
- Adjustment:
 - AUTO/MANU→AUTO
 - NTSC/PAL→NTSC
 - Y/C→C
 - METAL/OXIDE→OXIDE

• Adjustment procedures

- Test point : TP46/Extension board
- Adj. point : RF LEVEL VR/REC
Current Adjustment Tool
- Spec. : $A = 400 \pm 10\text{mV}$
(Fourth level)



Step 2.

• Setting

Equipment: Dualtrace Oscilloscope

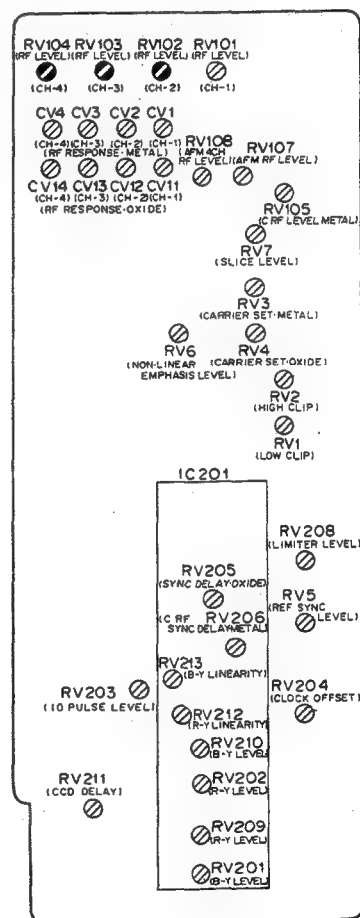
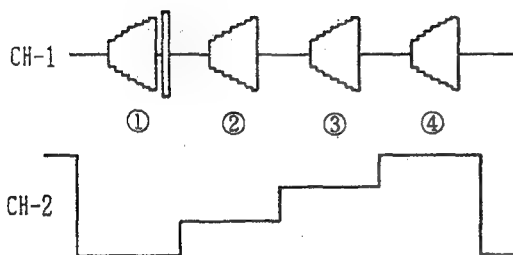
Board: VDA-11P board

• Preparation

- Adjust so that the specified level is the same as in Step 1.
- Put the unit into the REC mode and record the signal in the tape.

• Adjustment procedures

- Test point : CH-1 : TP46/Extension board
CH-2 : TP8/Extension board
- Adj. point : HEAD② : ● RV102 (CH-2 RF LEVEL)/VDA-11P
HEAD③ : ● RV103 (CH-3 RF LEVEL)/VDA-11P
HEAD④ : ● RV104 (CH-4 RF LEVEL)/VDA-11P



VDA-11P BOARD (SOLDERING SIDE)

Step 3.

• Setting

Equipment: Dualtrace Oscilloscope

Board: VP-24P board

• Preparation

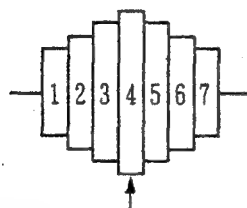
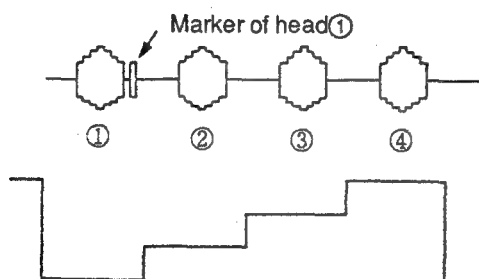
- Play back the recorded portion in Step 2.
- Memorize the maximum level for every four heads (① through ④)

• Adjustment procedures

• Test point : CH-1 : TP31/Extension board: VP-24P

CH-2 : TP25/Extension board: VP-24P

• Spec. :



Check the maximum PB RF level.

* The illustrated fourth level is maximum.

• Note

- Remove the tool between TP5 and E1 and install short-housing CNJ2.

Step 4.

• Setting

Equipment: Dualtrace Oscilloscope

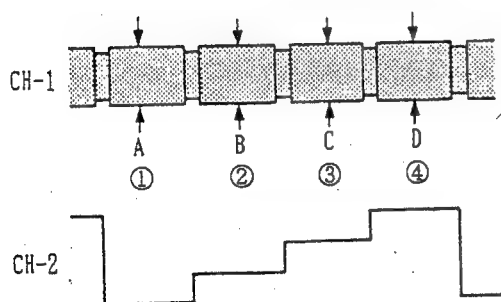
Board: VDA-11P board

• Preparation

- Input signal: 0% flat field
- Insert the BCT-20G and put the unit into the REC mode.

• Adjustment procedures

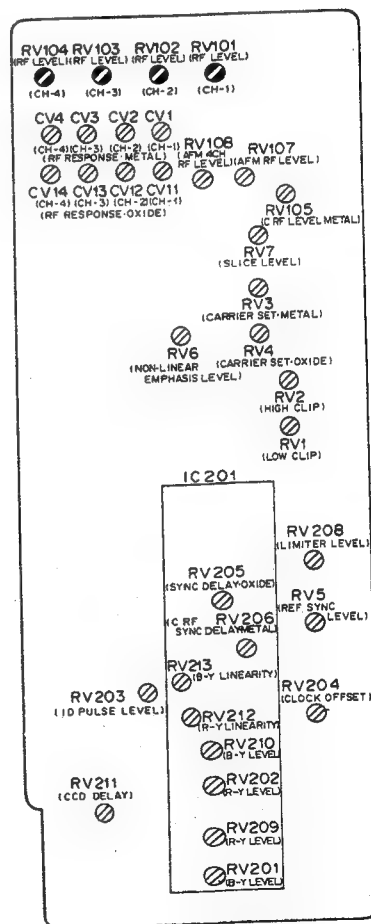
- Test point : CH-1 : TP46/Extension board
CH-2 : TP8/Extension board
- Adj. point : HEAD① : RV101 (CH-1 RF LEVEL)/VDA-11P
HEAD② : RV102 (CH-2 RF LEVEL)/VDA-11P
HEAD③ : RV103 (CH-3 RF LEVEL)/VDA-11P
HEAD④ : RV104 (CH-4 RF LEVEL)/VDA-11P
- Spec. : Adjust the voltage so that A, B, C, and D correspond to the maximum levels memorized in Step 3.



[Correspondence Table]

1	2	3	4	5	6	7
310	340	370	400	430	475	500

(mVp-p)



VDA-11P BOARD (SOLDERING SIDE)

0. V I P C I E M I A L I G N M E N T I

- Setting

Equipment: Dualtrace Oscilloscope

Board:

- Preparation

- Calculate the calibration value on the standard player (equivalent to BVW-75P).
Calibration Value = (Chart 1) - (CR5-2APS playback level)
- Playback the randomly recorded portions using the standard player BVW-300AP.

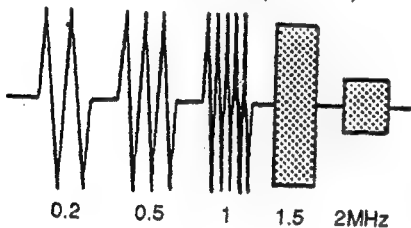
0.5 MHz	100 %
1 MHz	100 %
1.5 MHz	85 %

Chart 1

- Adjustment procedures

R-Y OUT/BVW-75P (or equivalent)

B-Y OUT/BVW-75P (or equivalent)



FREQUENCY	LEVEL
0.2MHz	100% (REFERENCE)
0.5MHz	(100-Calibration value) $\pm 5\%$
1MHz	(100-Calibration value) $\pm 5\%$
1.5MHz	(85-Calibration value) $^{+5}_{-15} \%$

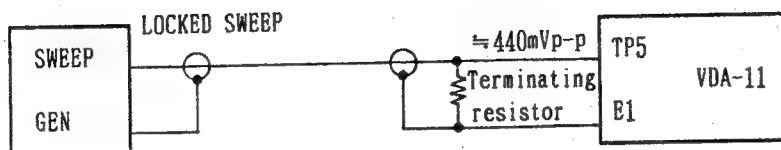
- The level difference between the CH-1 and the CH-2 should be in the 5% or the less.
- When the specification is not satisfied, re-adjust the C recording current frequency response adjustment (Oxide) with the specification. After the adjustment, perform the C recording current adjustment (Oxide).

8-5-34. C REC Current Frequency Response Adjustment (Metal)

• Setting

Equipment: Dualtrace Oscilloscope	Board: VDA-11P board
-----------------------------------	----------------------

• Connection



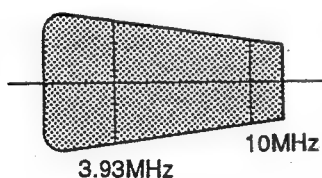
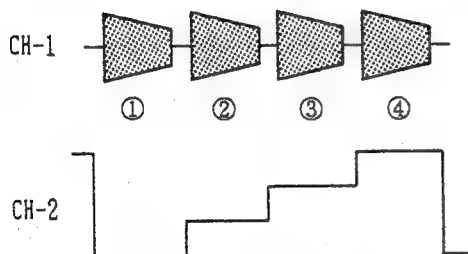
• Preparation

- Remove short-housing CNJ2 on the VDA-11P board, connect the Sweep Signal Generator between TP5 on the VDA-11P board and E1 on the VDA-11P board, and supply a locked sweep signal.
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

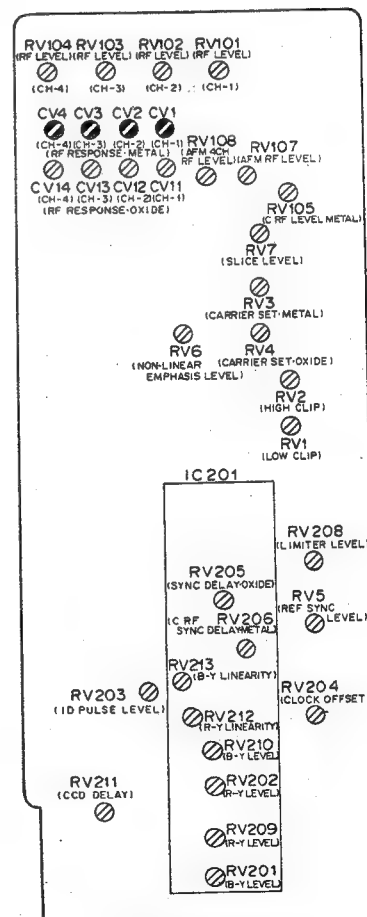
- Test point : CH-1 : TP46/Extension board
CH-2 : TP8/Extension board
- Adj. point : ① : CV1 (CH-1 RF RESP)/VDA-11P
② : CV2 (CH-2 RF RESP)/VDA-11P
③ : CV3 (CH-3 RF RESP)/VDA-11P
④ : CV4 (CH-4 RF RESP)/VDA-11P

• Spec.



frequency	level
3.93 MHz	100% reference
10 MHz	65 ±10%

TRIG : CH-2



VDA-11P BOARD (SOLDERING SIDE)

• Note

- After adjustment is completed, install short-housing CNJ2.

8-5-35. C REC Current Adjustment (Metal)

• Setting

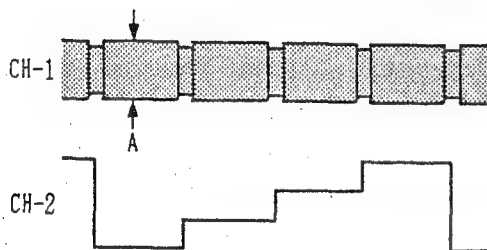
Equipment: Dualtrace Oscilloscope	Board: VDA-11P board
-----------------------------------	----------------------

• Preparation

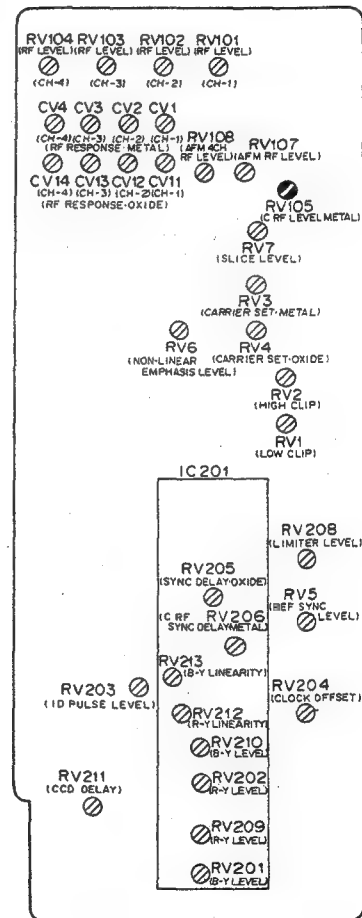
- Input signal: 0% flat field
- Connect a tantalum capacitor (1 to 10 μ F/16V) between TP35 and TP1, TP36 and TP2 on the Extension board. (TP1 and TP2 negative).
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : CH-1 : TP46/Extension board
CH-2 : TP8/Extension board
- Adj. point : ● RV105 (C RF LEVEL)/VDA-11P
- Spec. : Adjust so that A is one point eight times as high as the level of head ① which is set in Step 4 of Sec. 8-5-30 C REC Current Adjustment (Oxide).



Note: The each level of the head ① through ④ should be less than 1.0V.



VDA-11P BOARD (SOLDERING SIDE)

8-5-36. C Frequency Response Check (Metal)

• Setting

Equipment: Dualtrace Oscilloscope	Board:
-----------------------------------	--------

• Preparation

- Calculate the calibration value on the standard player (equivalent to BVW-75P).
Calibration Value = (Chart 1) - (CR5-1BPS playback level)
- Playback the randomly recorded portions using the standard player BVW-300AP.

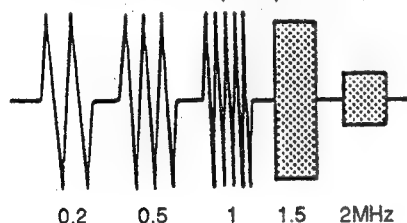
1 MHz	100 %
2 MHz	100 %
4 MHz	100 %

Chart 1

• Adjustment procedures

R-Y OUT/BVW-75P (or equivalent)

B-Y OUT/BVW-75P (or equivalent)



FREQUENCY	LEVEL
0.2MHz	100% (REFERENCE)
0.5MHz	(100-Calibration value) $\pm 5\%$
1MHz	(100-Calibration value) $\pm 5\%$
1.5MHz	(85-Calibration value) $^{+5}_{-15} \%$

- The level difference between the CH-1 and the CH-2 should be in the 5% or the less.
- When the specification is not satisfied, re-adjust the C recording current frequency response adjustment (Metal) within the specification. after the adjustment, perform the C recording current adjustment (Metal).

8-5-37. C REF Sync Position Tentative Adjustment (Metal)

• Setting

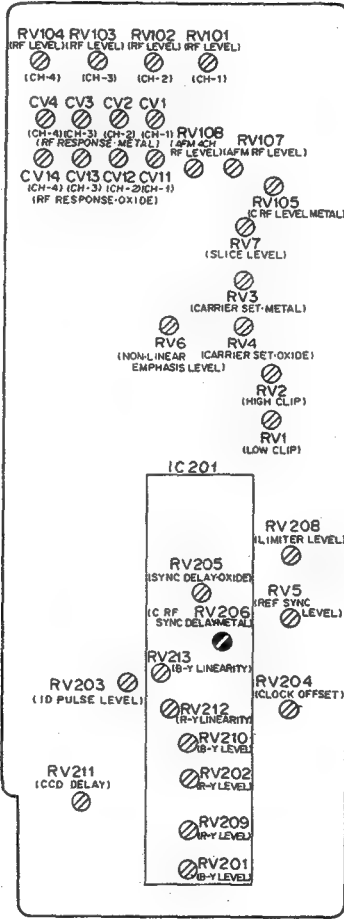
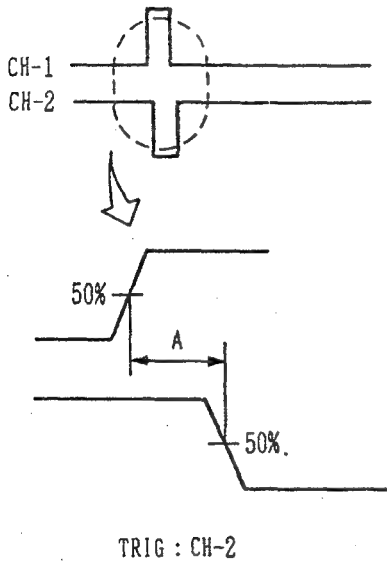
Equipment: Dualtrace Oscilloscope	Board: VDA-11P board
-----------------------------------	----------------------

• Preparation

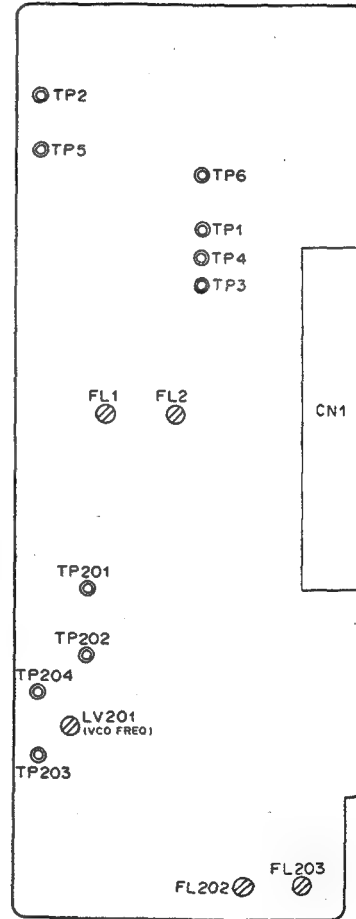
- Input signal: MOD pulse and bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : CH-1 : TP17/Extension board
CH-2 : TP3/VDA-11P
- Adj. point : ● RV206 (C REF SYNC DELAY METAL)/VDA-11P
- Spec. : A = 195 ± 5 nsec



VDA-11P BOARD (SOLDERING SIDE)



VDA-11P BOARD (COMPONENT SIDE)

- Setting

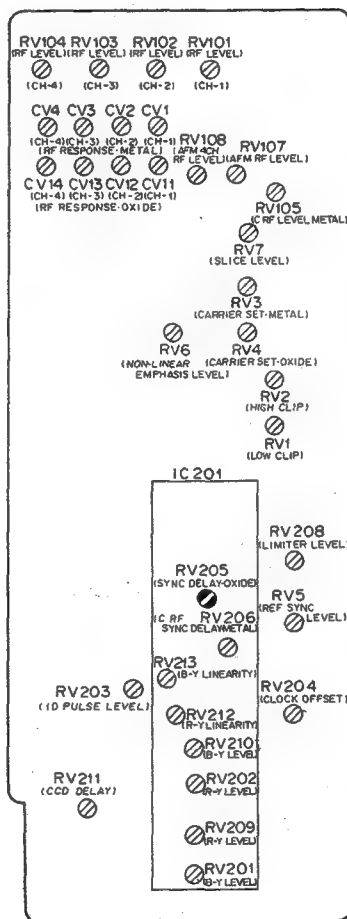
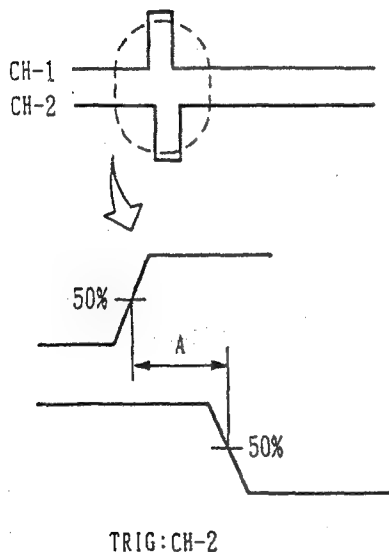
Board: VDA-11P board

- Preparation

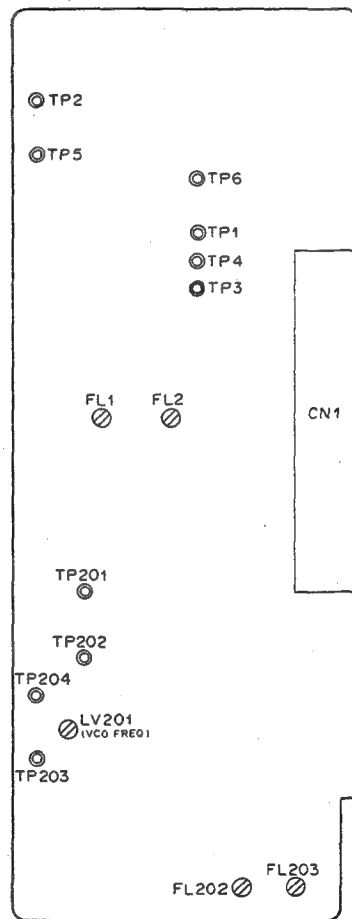
- Input signal: MOD pulse and bar
- Insert the BCT-20G and put the unit into the REC mode.

- Adjustment procedures

- Test point : CH-1 : TP17/Extension board
CH-2 : TP3/VDA-11P
- Adj. point : Ⓢ RV205 (C REF SYNC
DELAY OXIDE)/VDA-11P
- Spec. : A = 185±5nsec



VDA-11P BOARD (SOLDERING SIDE)



VDA-11P BOARD (COMPONENT SIDE)

VTD SYSTEM ALIGNMENT

8-5-39. Composite Y/C Delay Adjustment (Metal)

Step 1.

- Note

• A standard VTR (BVW-75P or the equivalent) which is adjusted to the specified value is used in this adjustment.

- Setting

Equipment: Dualtrace Oscilloscope

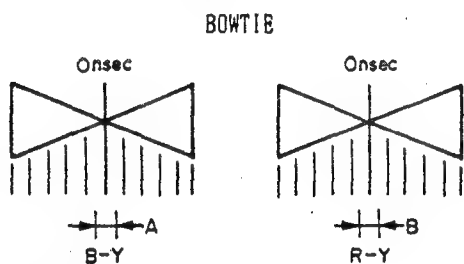
Board: VDA-11P board

- Preparation

- Input signal: BOWTIE (TSG-300)
- Insert the BCT-20M and put the unit into the REC mode.
- Play back the recorded tape using a standard VTR player.
- Set the Y/C DELAY control of a standard VTR player to PRESET.

- Adjustment procedures

- Test point : CAV Y } OUT/Standard VTR
CAV R-Y } (terminated by
CAV B-Y } 75 ohms)
- Spec. : A, B = ± 10 nsec



1. Check that the cross point of waveform is between A and B.
2. If the specification is not satisfied, check that the chroma signal is advanced or delayed.

- Setting

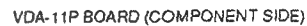
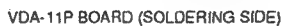
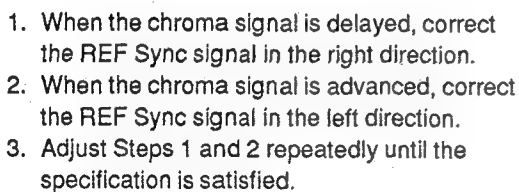
Board: VDA-11P board

- Preparation

- Insert the BCT-20M and put the unit into the REC mode.

- Adjustment procedures

- Test point : TP3/VDA-11P
- Adj. point : RV206 (C REF SYNC DELAY METAL)/VDA-11P
- Spec. :



8-5-40. Composite Y/C Delay Adjustment (Oxide)

Step 1.

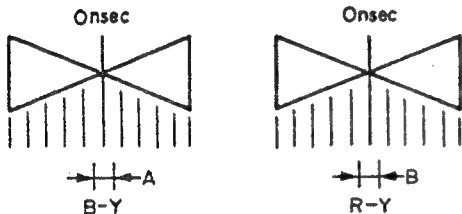
• Setting

Equipment: Dualtrace Oscilloscope	Board: VDA-11P board
-----------------------------------	----------------------

• Preparation

- Input signal: MOD pulse and bar
- Insert the BCT-20G and put the unit into the REC mode.
- Play back the recorded tape using a standard VTR.
- Set the Y/C DELAY control of a standard VTR to PRESET.

• Adjustment procedures

- Test point : CAV Y } OUT/Standard VTR
CAV R-Y } (terminated by
CAV B-Y } 75 ohms)
 - Spec. : A, B = ± 10 nsec
- BOWTIE
- 
1. Check that the cross point of waveform is between A and B.
 2. If the specification is not satisfied, check that the chroma signal is advanced or delayed.

• Note

- A standard VTR (BVW-75P or the equivalent) which is adjusted to the specified value is used in this adjustment.

Step 2

• Setting

Equipment: Dualtrace Oscilloscope

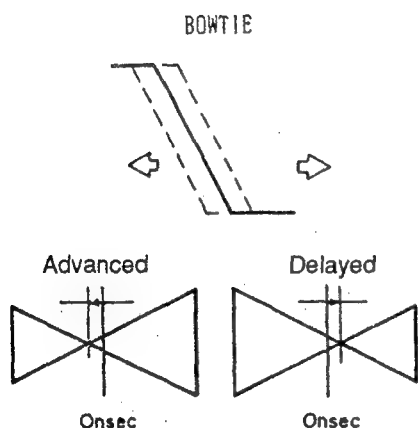
Board: VDA-11P board

• Preparation

- Insert the BCT-20G and put the unit into the REC mode.

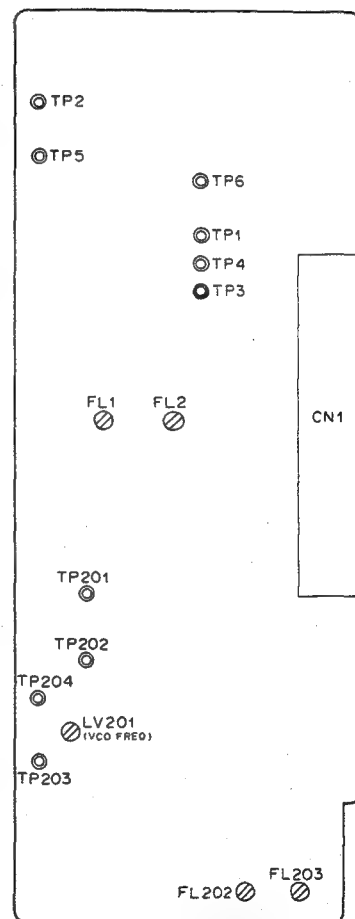
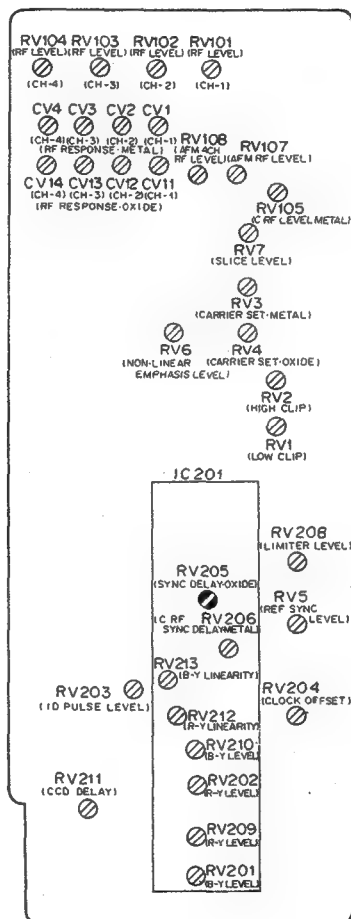
• Adjustment procedures

- Test point : TP3/VDA-11P
- Adj. point : ● RV205 (C REF SYNC DELAY OXIDE)/VDA-11
- Spec. :



TRIG:TP17/Extension board

1. When the chroma signal is delayed, correct the REF Sync signal in the right direction.
2. When the chroma signal is advanced, correct the REF Sync signal in the left direction.
3. Adjust Steps 1 and 2 repeatedly until the specification is satisfied.



8-5-41. AFM-RF Balance Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

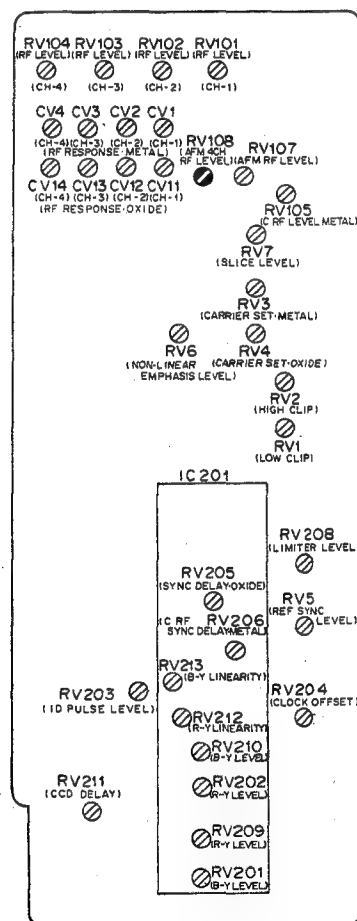
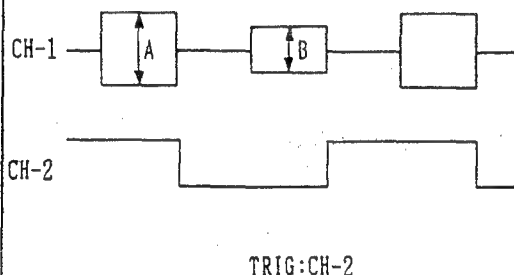
Board: VDA-11P board

• Preparation

- AUDIO IN CH-1/CH-2: No signal
- Insert the BCT-20M and put the unit into the REC mode.
- Play back the recorded tape using a standard VTR player (BVW-75P or the equivalent).
- REC mode→adjustment
- Play mode→check
- Player CAP Lock Mode "4 FIELD"

• Adjustment procedures

- Test point : CH-1 : IC602-14/VO-18 board:
BVW-75P series
CH-2 : TP31/EN-48 board:
BVW-75P series
- Adj. point : ● RV108 (AFM 4CH RF LEVEL)/
VDA-11P
- Spec. : $A = B \pm 15\%$



VDA-11P BOARD (SOLDERING SIDE)

8-5-42. Y PB RF Level Adjustment

- Setting

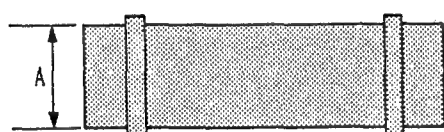
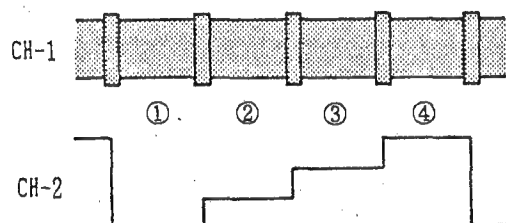
Equipment: Dualtrace Oscilloscope	Board: VP-24P board
-----------------------------------	---------------------

- Preparation

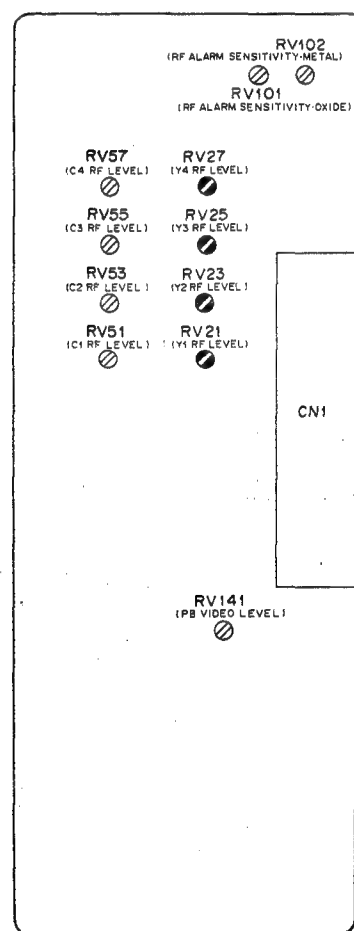
- Play back the flat signal on the alignment tape CR5-2APS.
- Make a tracking so that the RF level is maximum.

- Adjustment procedures

- Test point : CH-1 : TP33/Extension board
(Terminated by 75 ohms.)
CH-2 : TP25/Extension board
- Adj. point : ① : $\text{RV21 (Y1 RF LEVEL)/VP-24P}$
② : $\text{RV23 (Y2 RF LEVEL)/VP-24P}$
③ : $\text{RV25 (Y3 RF LEVEL)/VP-24P}$
④ : $\text{RV27 (Y4 RF LEVEL)/VP-24P}$
- Spec. : $A = 220 \pm 20\text{mV}$



TRIG:CH-2



VP-24P BOARD (COMPONENT SIDE)

8-5-43. C PB RF Level Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

Board: VP-24P board

• Preparation

- Play back the flat field signal on the alignment tape CR 5-2APS.
- Make a tracking so that the RF level is maximum.

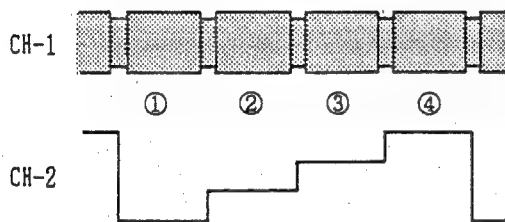
• Adjustment procedures

- Test point : CH-1 : TP31/Extension board
(Terminated by 75 ohms.)

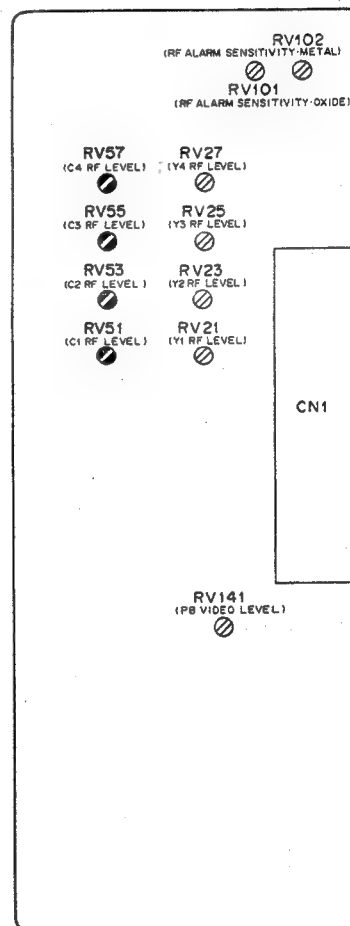
CH-2 : TP25/Extension board

- Adj. point : ① : RV51 (C1 RF LEVEL)/VP-24P
② : RV53 (C2 RF LEVEL)/VP-24P
③ : RV55 (C3 RF LEVEL)/VP-24P
④ : RV57 (C4 RF LEVEL)/VP-24P

- Spec. : A = $220 \pm 20\text{mV}$



TRIG : CH-2



VP-24P BOARD (COMPONENT SIDE)

8-5-44. VF PB Output Level Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

Board: VP-24P board

• Adjustment procedures

• Test point : TP38/Extension board

• Adj. point : Step 1.

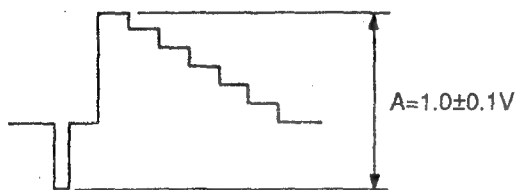
● RV141 (PB VIDEO LEVEL) /
VP-24P

• Spec. : A = $1.0 \pm 0.1V$

B = $0.66 \pm 0.1V$

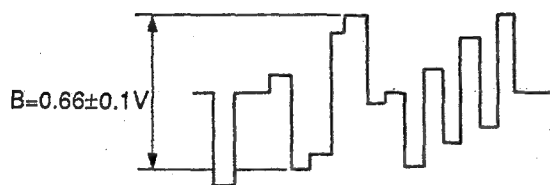
Step 1.

• Play back the color-bar signal on the alignment tape CR5-2APS.

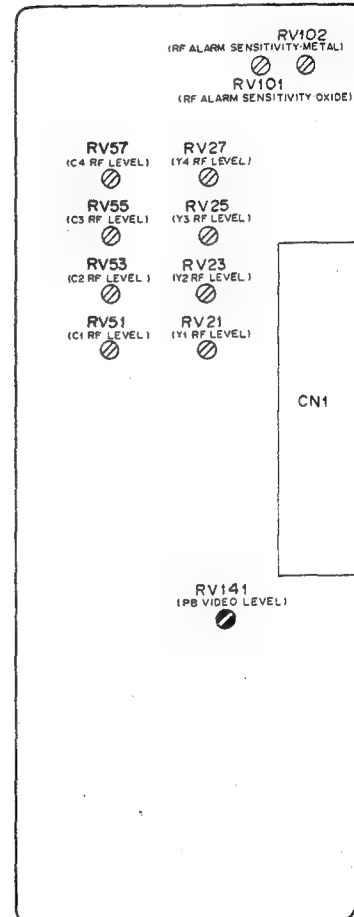


Step 2.

• Press the CTDM button.



Check that level A is $0.5 \pm 0.1V$



VP-24P BOARD (COMPONENT SIDE)

8-5-45. RF Alarm Sensitivity Adjustment

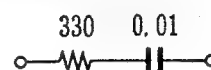
• Setting

Equipment: Dualtrace Oscilloscope	Board: VP-24P board
-----------------------------------	---------------------

• Preparation

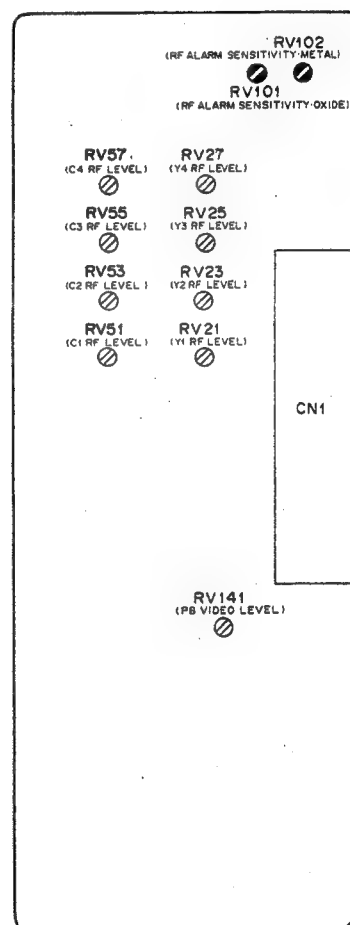
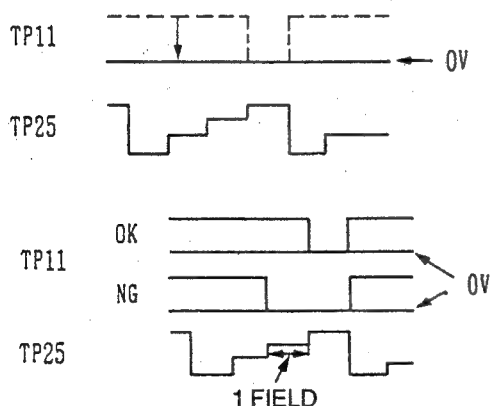
- Input signal: built-in color-bar
- Connect the clip cord with CR between TP26 and TP1 on the extension board.

- chip cord with CR



• Adjustment procedures

- Test point : TP11/Extension board:VP-24P
TP25/Extension board: VP-24P
- Adj. point :
 - OXIDE adjustment
 - RV101 (RF ALARM SENSITIVITY: OXIDE) /VP-24P
 - METAL adjustment
 - RV102 (RF ALARM SENSITIVITY: METAL) /VP-24P
- Spec. : Adjust so that the pulse waveform of the TP11 becomes 0V level point.



VP-24P BOARD (COMPONENT SIDE)

1. Insert the BCT-20G and put the unit into the REC mode. (OXIDE adjustment)
2. After OXIDE adjustment, insert the BCT-20M and put the unit into the REC mode. (METAL mode)
3. After adjustment is completed, remove the clip cord.
4. Confirm that the waveform of the TP11 is not fall to 0V in over 2 fields continuously. When NG, readjust the 1~3.

The video system adjustment method has been changed along with the changes of the video board (VDA-11). Adjust according to the serial number on the right.

Serial No.	Adjustment page
44161 and higher	8-89-8-149

8-5. VIDEO SYSTEM ADJUSTMENT

【Equipment】

- Component signal Generator: TEKTRONIX TSG-300 or the equivalent
- Digital Voltmeter
- Dual trace Oscilloscope
- Frequency counter
- Sweep Generator
- Spectrum Analyzer
- DC power: AC-500 or the equivalent
- Waveform Vector Monitor: TEKTRONIX 1750 or the equivalent
- Standard VTR player: BVW-75P or the equivalent
- Rec Current Adj Tool (EW-571)
- Video signal Input Board: EW-573
- Blank tape: BCT-20G or BCT-20M
- Alignment Tape: CR5-2APS (8-960-098-44): OXIDE
CR5-1BPS (8-960-096-91): METAL

【Switches setting on the function panel】

Do not change the setting below unless otherwise specified.

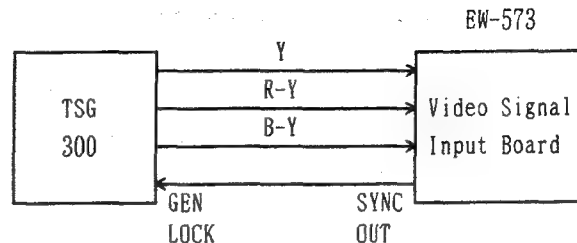
- VTR switch: STBY
- OUTPUT/DCC selector: BARS

*Alignment tape: CR5-2APS

TIME min.sec	VIDEO TRACK	DESCRIPTION
0:00	75% Color Bar	
3:00	Multi Burst	Y : 0.5,1,2,3,4,1,4.5 MHz C : 0.2,0.5,1,1.5 MHz
6:00	Bowtie & 10T	C : No Signal
9:00	Pulse & Bar	
11:00	Sw'P Shifted	
13:00	Composite Monoscope	Video Phase
15:00		

【Preparation】 (When using the signal except from the built-in color-bar.)

1. Remove the EN-79P board.
2. Insert the Video Signal Input Board and connect as illustrated below.



3. After adjustment is completed, install the EN-79P board and check (or readjust) Sec. 8-5-4. CTDM Level Adjustment and 8-5-16. Y Input Level Adjustment using a BARS signal from the camera.

*Alignment tape: CR5-1BPS

TIME min.sec	VIDEO	AFM
0:00	RF SWEEP Marker 1, 2, 4, 6, 8, 10, 12 MHz	No-Signal
2:00	60% H, SWEEP (CTDM) Marker 0.5, 1, 2, 3, 4, 5 MHz	
5:00	PULSE & BAR (CTDM)	
8:00	MULTI BURST Y : 0.5,1,2,4,5,5.5 MHz C : 0.2,0.5,1,1.5,2 MHz	
11:00	PULSE & BAR	
14:00		400Hz sine wave (25KHz deviation) (75KHz deviation)
16:30	100% COLOR BARS	
17:00		No-Signal
19:00	50% BOWTIE & 10T	
22:00	LINE 17A SIGNAL	
24:00	QUAD PHASE	
26:00	FLAT FIELD	
28:00	100% COLOR BARS with dropout	
30:00	COMPOSITE H, SWEEP with VISC	

8 VTR SYSTEM ALIGNMENT

8-5-1. PLL VCO Error Voltage Adjustment

• Setting

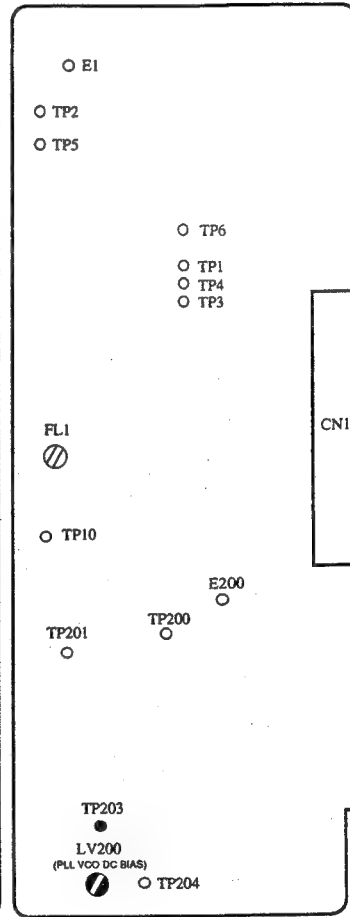
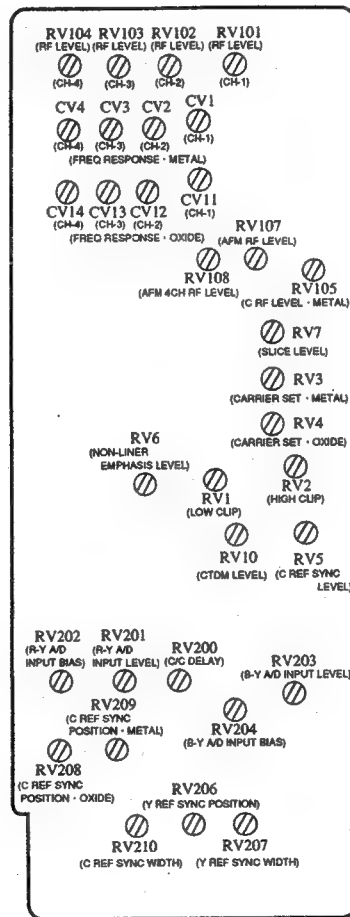
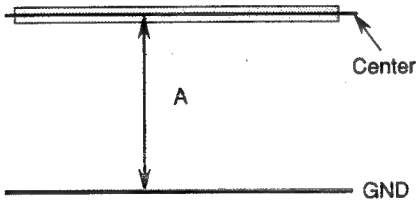
Equipment: Dualscope Oscilloscope	Board: VDA-11P board
-----------------------------------	----------------------

• Preparation

- built-in color-bar
- Insert the BOT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP203/VDA-11P
- Adj. point : \bullet LV200 (PLL VCO DC BIAS)/VDA-11P
- Spec. : $A = 1.80 \pm 0.05V_{dc}$



8-5-2. R-Y, B-Y A/D Clamp Adjustment

• Setting

Equipment: Dualscope Oscilloscope

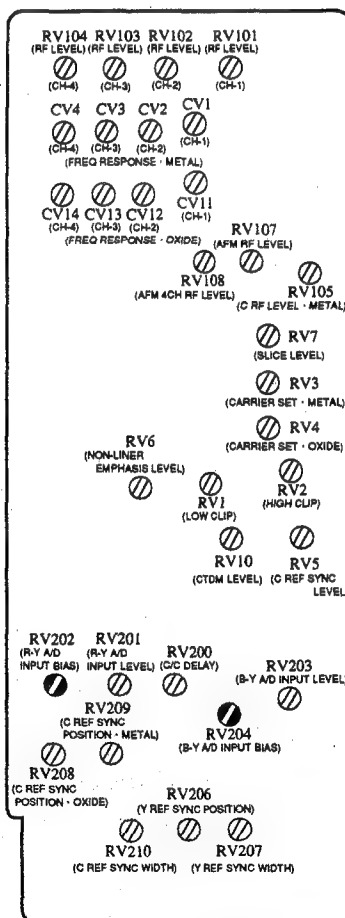
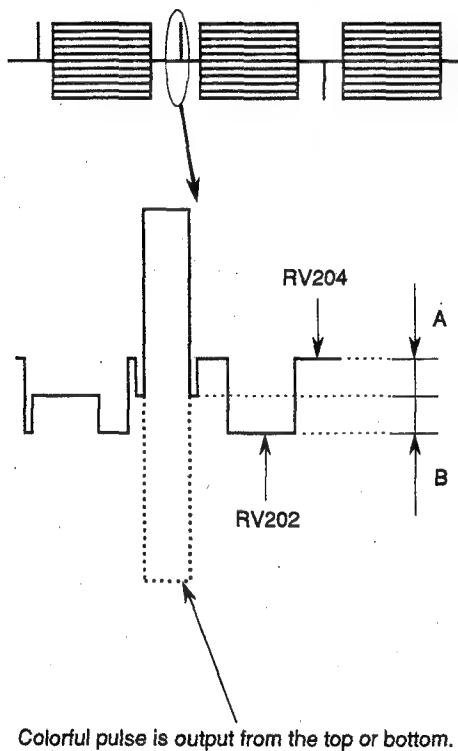
Board: VDA-11P board

• Preparation

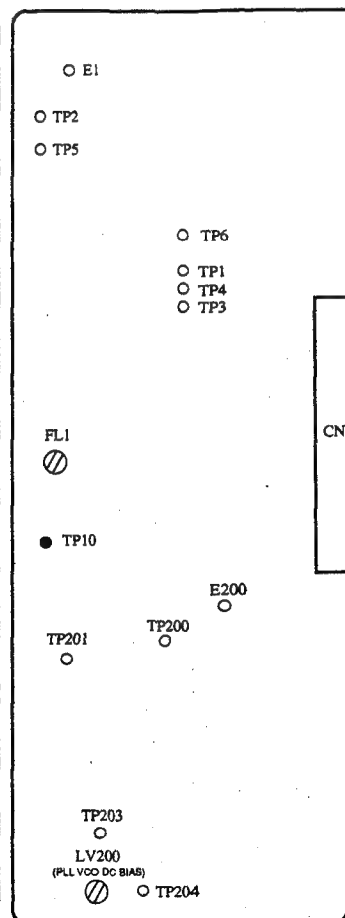
- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP10/VDA-11P
- Adj. point : R-Y Level
 ○RV202 (R-Y A/D INPUT BIAS)/VDA-11P
 B-Y Level
 ○RV204 (B-Y A/D INPUT BIAS)/VDA-11P
- Spec. : A = B = 0 (No difference)



VDA-11/P BOARD(SOLDERING SIDE)



VDA-11/P BOARD(COMPONENT SIDE)

8-5-3. R-Y, B-Y A/D Input Level Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

Board: VDA-11P board

• Preparation

- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

• Test point : TP10/VDA-11P

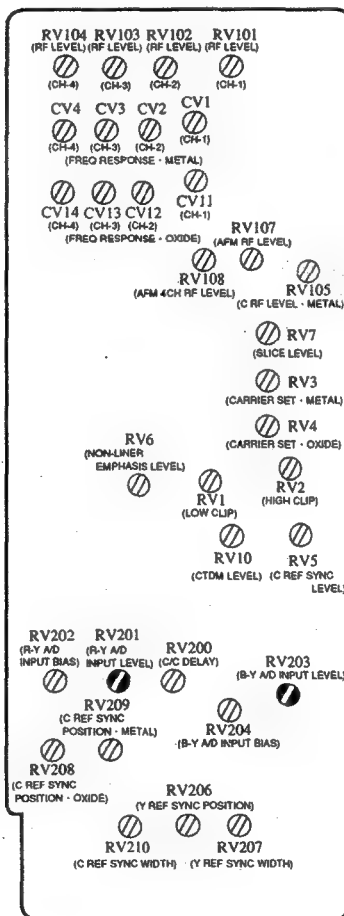
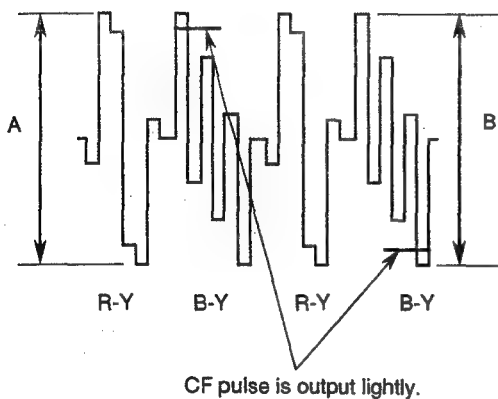
• Adj. point : R-Y Level

●RV201 (R-Y A/D INPUT LEVEL)/VDA-11P

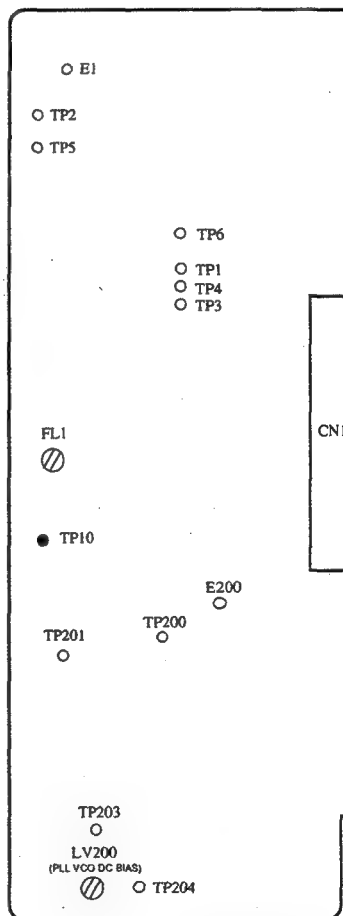
B-Y Level

●RV203 (B-Y A/D INPUT LEVEL)/VDA-11P

• Spec. : A = B = 750 ± 10 mVp-p



VDA-11P BOARD(SOLDERING SIDE)



VDA-11P BOARD(COMPONENT SIDE)

8-5-4. CTDM Level Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

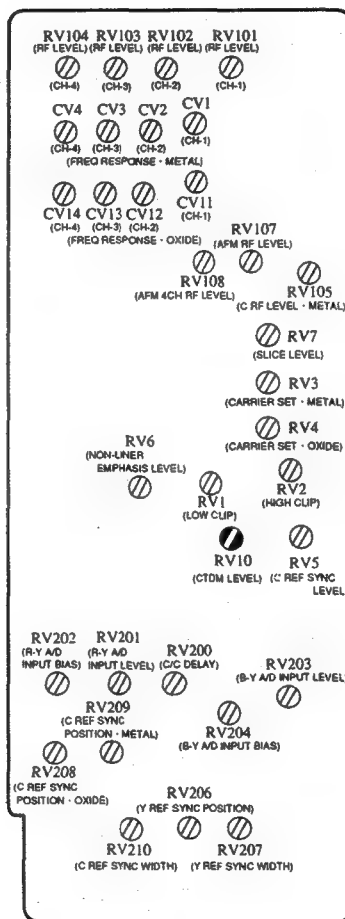
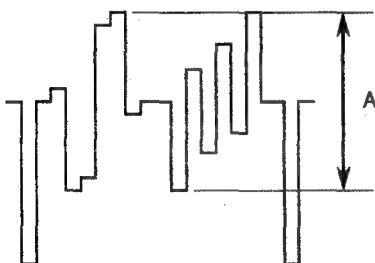
Board: VDA-11P board

• Preparation

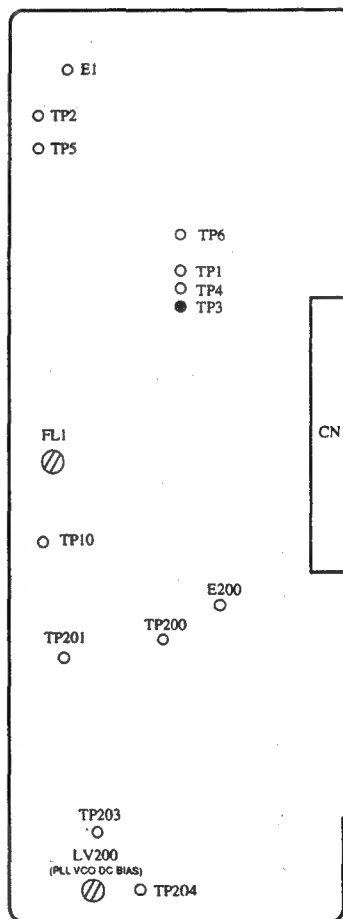
- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP3/VDA-11P
- Adj. point : ●RV10 (CTDM LEVEL)/VDA-11P
- Spec. : $A = 667 \pm 10 \text{ mVp-p}$



VDA-11P BOARD(SOLDERING SIDE)



VDA-11P BOARD(COMPONENT SIDE)

8-5-5. C REF Sync Level Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

Board: VDA-11P board

• Preparation

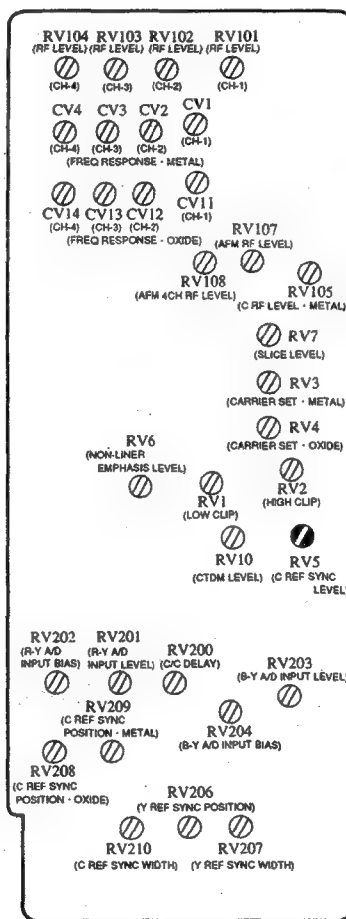
- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

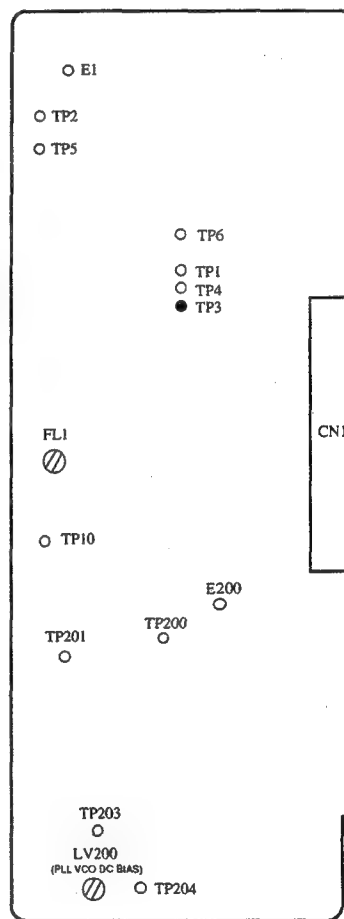
- Test point : TP3/VDA-11P
- Adj. point : ●RV5 (C REF SYNC LEVEL)/VDA-11P
- Spec. : $A = 0.598 \pm 0.01V$



TRIG : INT



VDA-11P BOARD(SOLDERING SIDE)



VDA-11P BOARD(COMPONENT SIDE)

8-5-6. C REF Sync Pulse Width Adjustment

- Setting

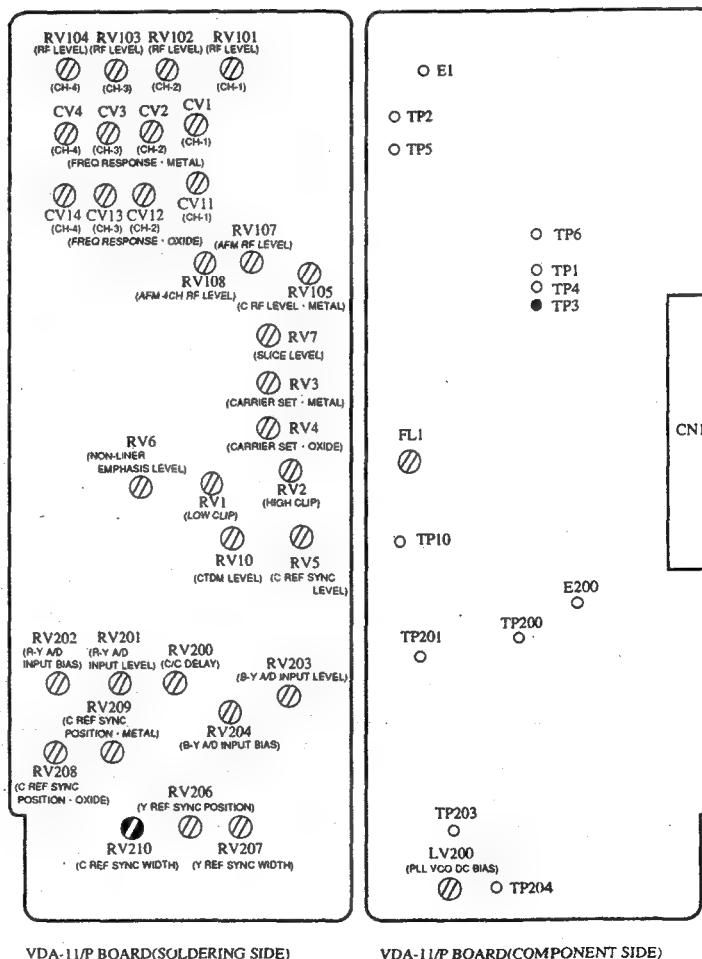
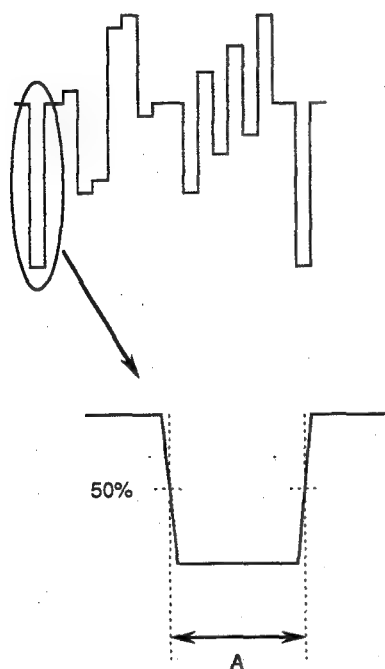
Equipment: Dualtrace Oscilloscope	Board: VDA-11P board
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- Preparation

- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

- Adjustment procedures

- Test point : TP3/VDA-11P
- Adj. point : ⓄRV210 (C REF SYNC WIDTH)/VDA-11P
- Spec. : A = $2.00 \pm 0.05 \mu \text{ sec}$



8-5-7. C REF Sync Trapezoid Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

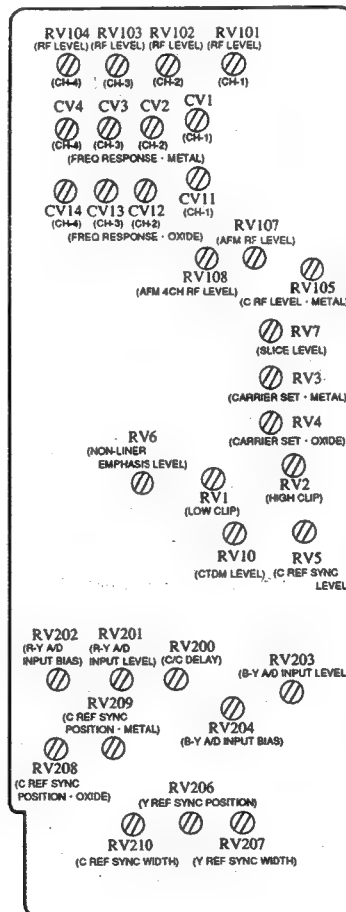
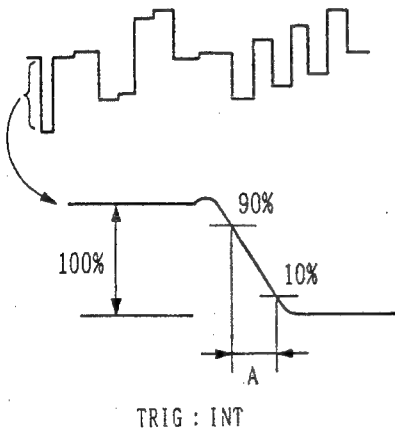
Board: VDA-11P board

• Preparation

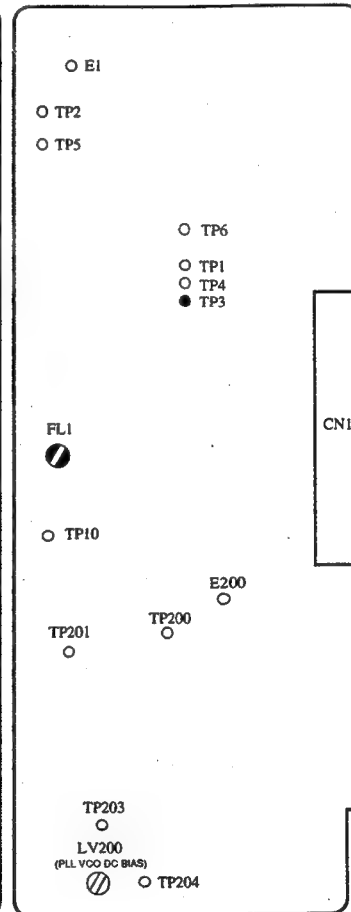
- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP3/VDA-11P
- Adj. point : ●FL1/VDA-11P
- Spec. : $A = 220 \pm 20 \text{ nsec}$



VDA-11/P BOARD(SOLDERING SIDE)



VDA-11/P BOARD(COMPONENT SIDE)

8-5-8. C Carrier/Deviation Adjustment

1) Adjustment using Spectrum Analyzer

Step.1

• Setting

Equipment: Spectrum Analyzer

Board: VDA-11P board

• Preparation

- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

• Test point : TP5/VDA-11P

• Adj. point : Carrier adjustment

●RV3

(CARRIER SET METAL)/VDA-11P

Deviation adjustment

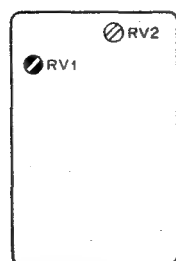
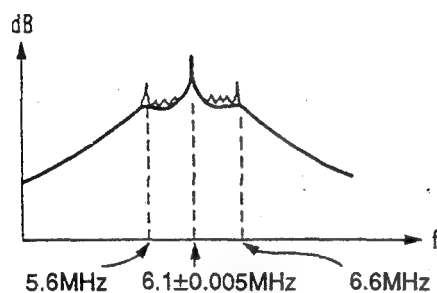
●RV1 (IC2)/VDA-11

• Spec. : Carrier adjustment

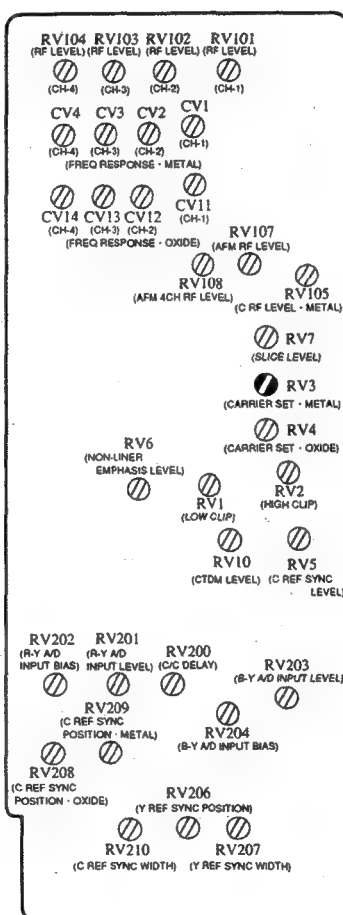
Set the center peak level to 6.1MHz.

• Deviation adjustment

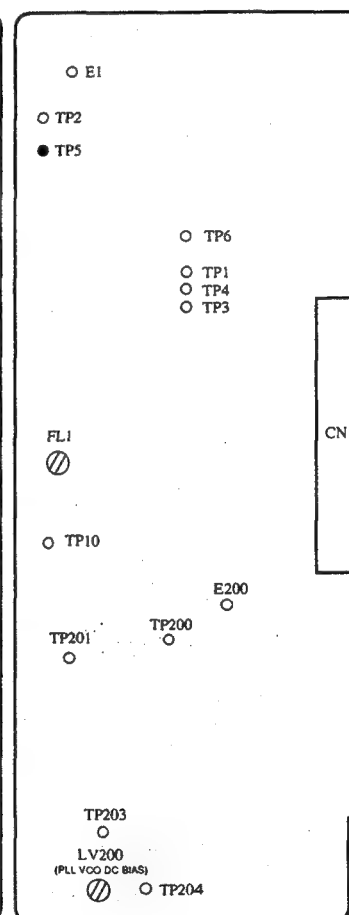
Set the gap between the two peaks (5.6MHz and 6.6MHz) to 1MHz.



HIC (IC2)
(COMPONENT SIDE)
-On the VDA-11P Board-



VDA-11P BOARD(SOLDERING SIDE)



VDA-11P BOARD(COMPONENT SIDE)

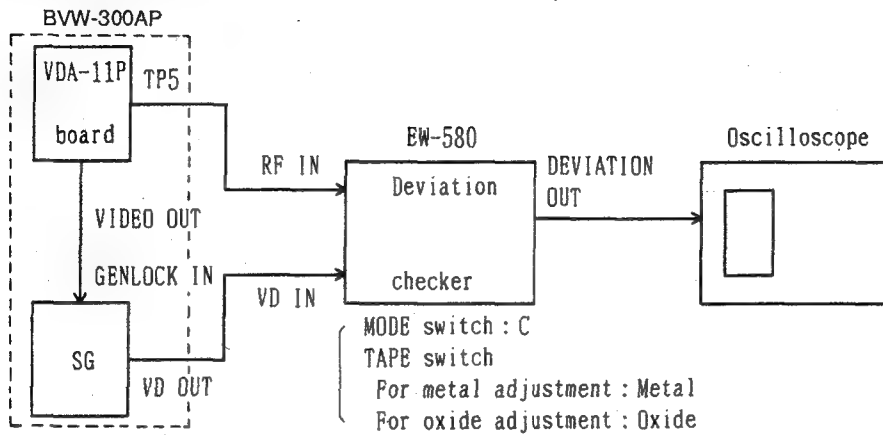
2) Adjustment using Deviation Checker

• Setting

Equipment: Dualtrace Oscilloscope

Board: VDA-11P board

• Connection

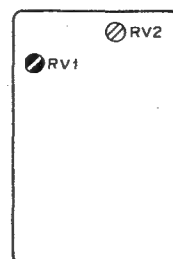
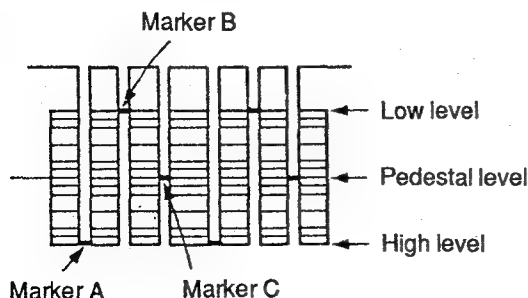


• Preparation

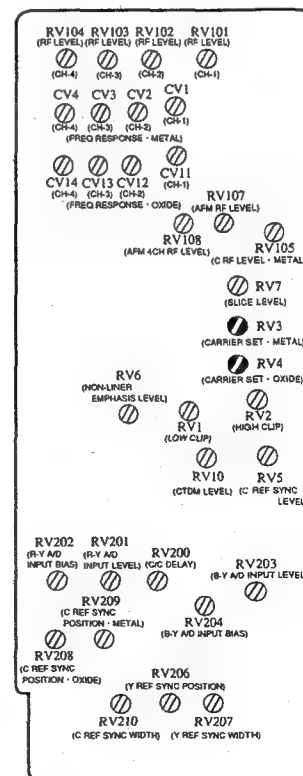
- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.
- After metal adjustment is completed, insert the BCT-20G and put the unit into the REC mode.

• Adjustment procedures

- Test point : DEVIATION OUT (DEVIATION CHECKER)
- Adj. point : • METAL
 - Marker C adjustment (Carrier setting)
 - RV3 (CARRIER SET)/VDA-11P
 - Marker A and B adjustment (deviation)
 - RV1 (IC2)/VDA-11P
- OXIDE
 - Marker C Adjustment (Carrier setting)
 - RV4 (CARRIER SET)/VDA-11P
- Spec. : Procedure
 1. Set marker C to the pedestal level.
 2. Set marker A to the high level and marker B to the low level.
 3. Set oxide marker C to the pedestal level.



HIC (IC2)
(COMPONENT SIDE)
-On the VDA-11/11P Board-



VDA-11/P BOARD(SOLDERING SIDE)

Step 2

• Setting

Equipment: Spectrum Analyzer

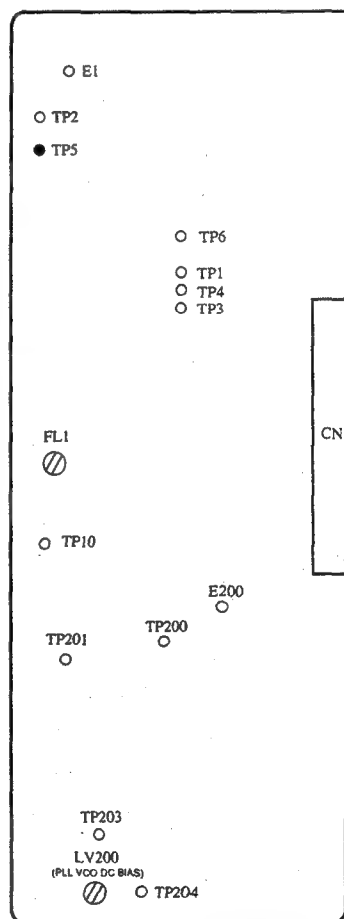
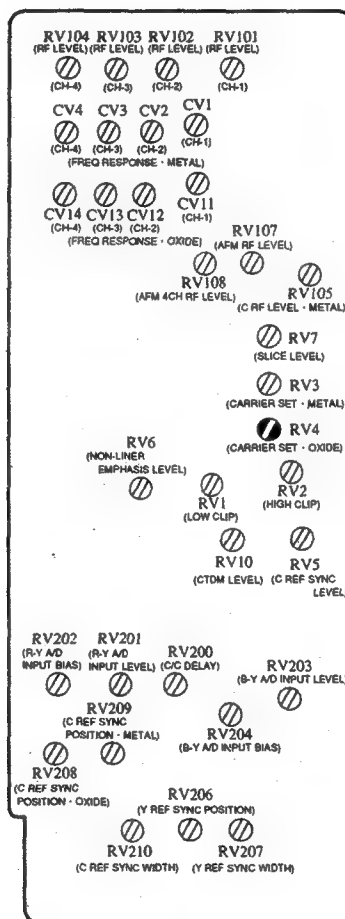
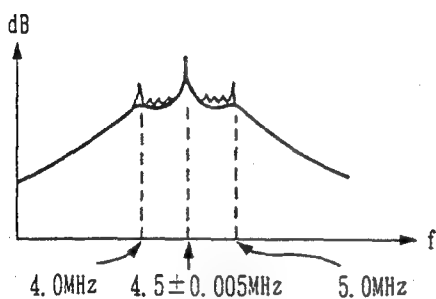
Board: VDA-11P board

• Preparation

- built-in color-bar
- Insert the BCT-20G and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP5/VDA-11P
- Adj. point : Carrier adjustment
 ●RV4
 (CARRIER SET OXIDE)
 /VDA-11P
- Spec. : Carrier adjustment
 Set the center peak level to 4.5MHz.



R VTR SYSTEM ALIGNMENT

8-5-9. C Low Clip Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

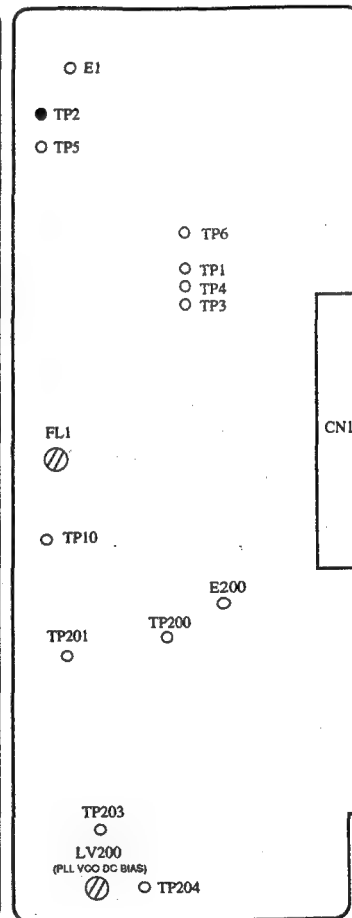
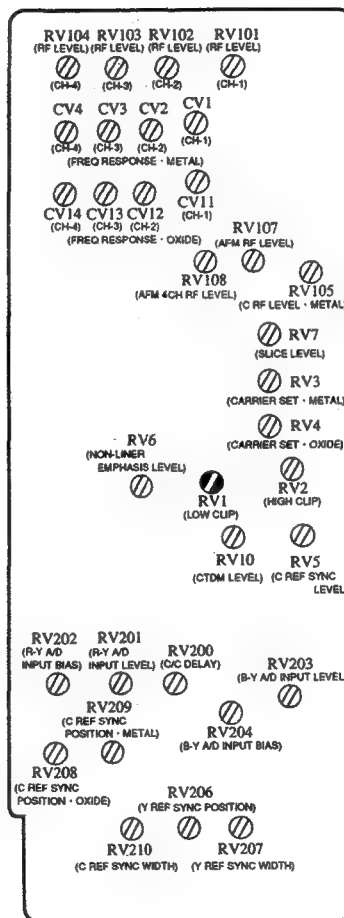
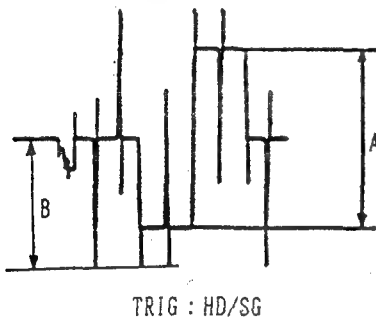
Board: VDA-11P board

• Preparation

- Input signal: pulse & bar (3T, 2T)
- Insert the BCT-20G and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP2/VDA-11P
- Adj. point : ●RV1 (LOW CLIP)
/VDA-11P
- Spec. : $A = R\text{-}Y/B\text{-}Y \text{ level}$
 $B = A \times 130 \pm 5\%$



8-5-10. C High Clip Adjustment

• Setting

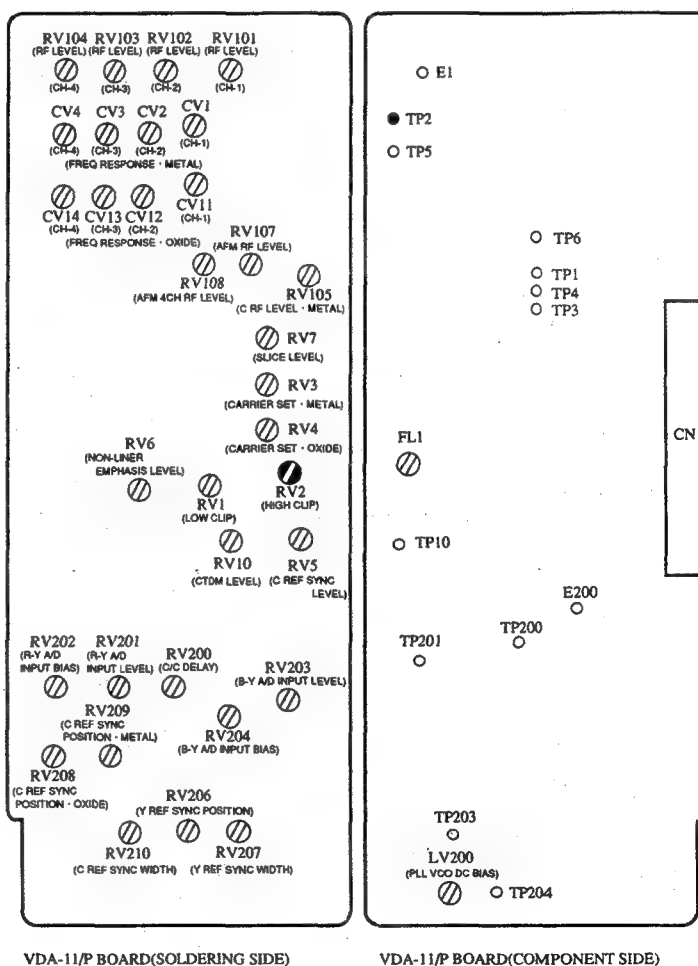
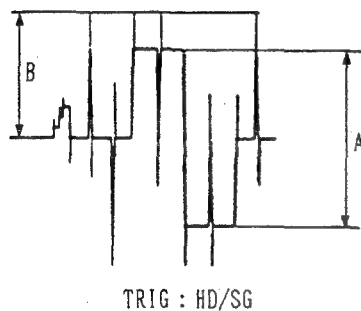
Equipment: Dualtrace Oscilloscope	Board: VDA-11P board
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• Preparation

- Input signal: pulse & bar (3T, 2T)
- Insert the BCT-20M and put the unit into the REC mode.
- After level A is measured, set the chroma level to +6dB and adjust level B.

• Adjustment procedures

- Test point : TP2/VDA-11P
- Adj. point : ●RV2 (HIGH CLIP)
/VDA-11P
- Spec. : A= R-Y/B-Y level
B= $A \times 285 \pm 5\%$



VDA-11/P BOARD(SOLDERING SIDE)

VDA-11/P BOARD(COMPONENT SIDE)

• Note

- If the chroma level of the signal generator can not be +6dB, remove the R-Y, B-Y terminated resistors R3 and R4 on the Video Signal Input Board (EW-573) temporarily and perform the adjustment.

8-5-11. C Nonlinear Emphasis Level Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

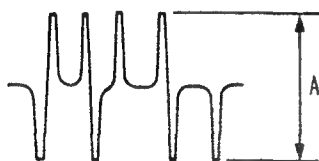
Board: VDA-11P board

• Preparation

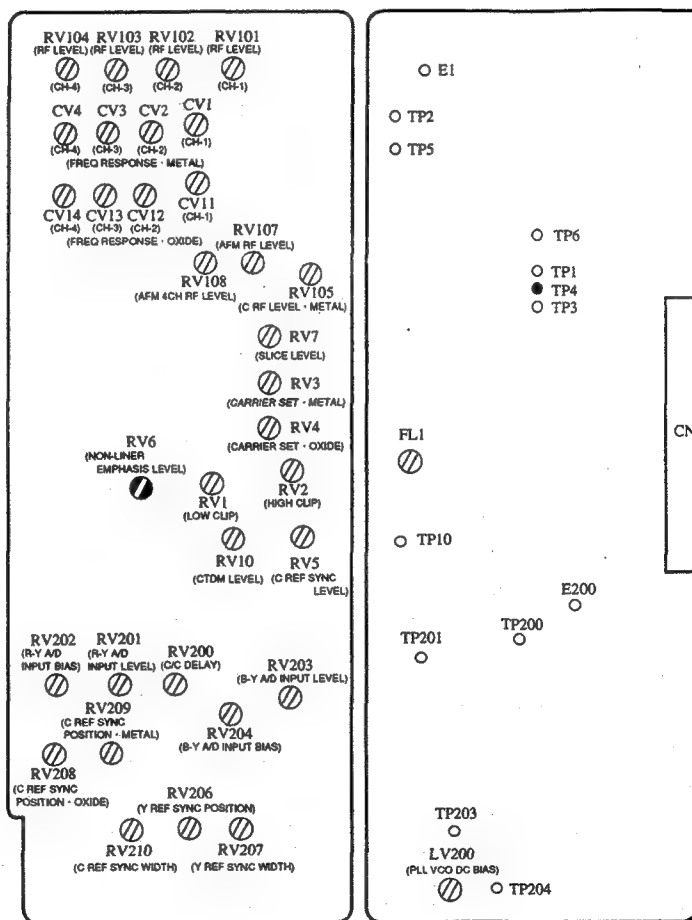
- Input signal: pulse & bar (3T, 2T)
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP4/VDA-11P
- Adj. point : **RV6 (NON-LINEAR EMPHASIS LEVEL)/VDA-11P**
- Spec. : $A=76\pm 2\text{mV}$



TRIG : HD/SG



8-5-12. C REC HF Adjustment

• Setting

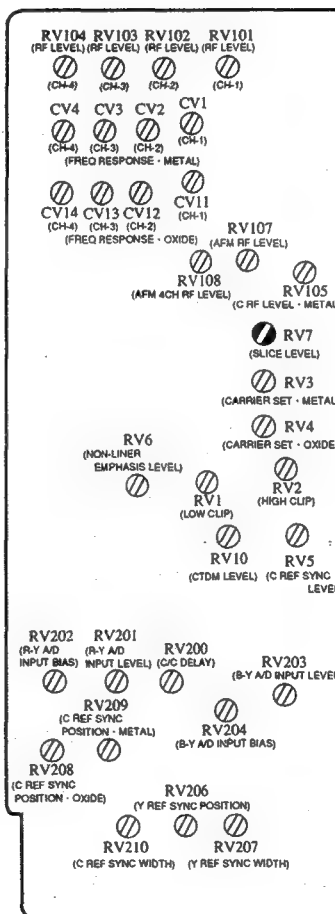
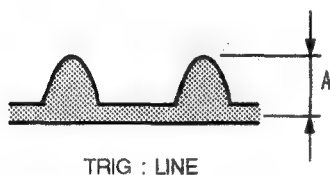
Equipment: Dualtrace Oscilloscope	Board: VDA-11P board
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• Preparation

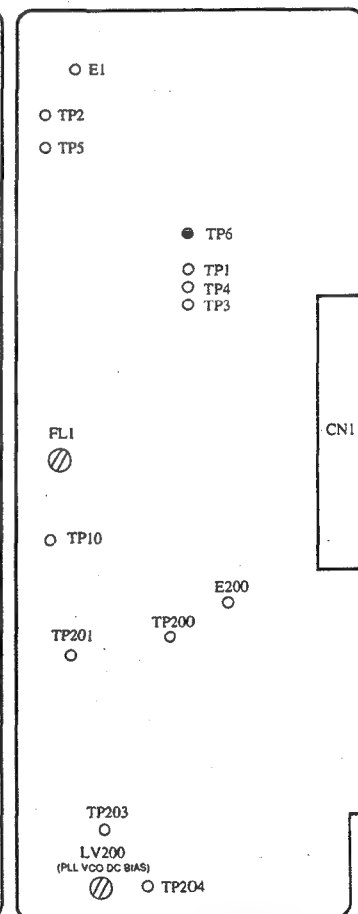
- Y, B-Y input signal: 0% flat field
- R-Y input signal: H sweep (For only RF, 1Vp-p/75ohms) TP-39/Extention board.
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP6/VDA-11P
- Adj. point : ●RV7 (SLICE LEVEL)/VDA-11P
- Spec. : $A=60\pm 2\text{mVp-p}$
(Measured at hte waveform center.)



VDA-11P BOARD(SOLDERING SIDE)



VDA-11P BOARD(COMPONENT SIDE)

8-5-13. C MOD Carrier Balance Adjustment

• Setting

Equipment: Spectrum Analyzer

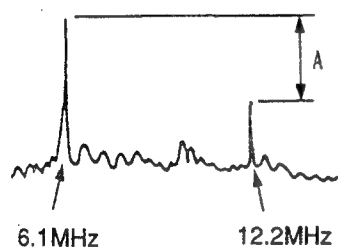
Board: VDA-11P board

• Preparation

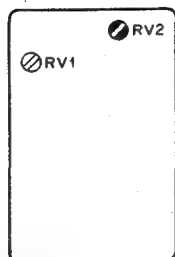
- Input signal: 0% flat field
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

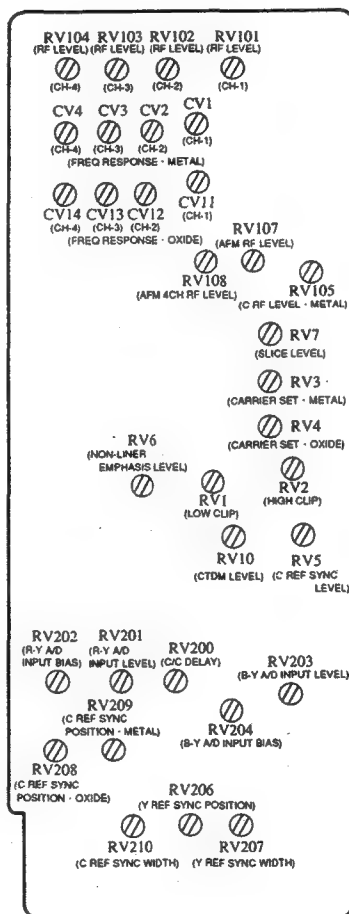
- Test point : TP5/VDA-11P
- Adj. point : ●RV2 (IC2)/VDA-11P
- Spec. : Minimize the level at 12.2MHz.
(A=40dB or more)



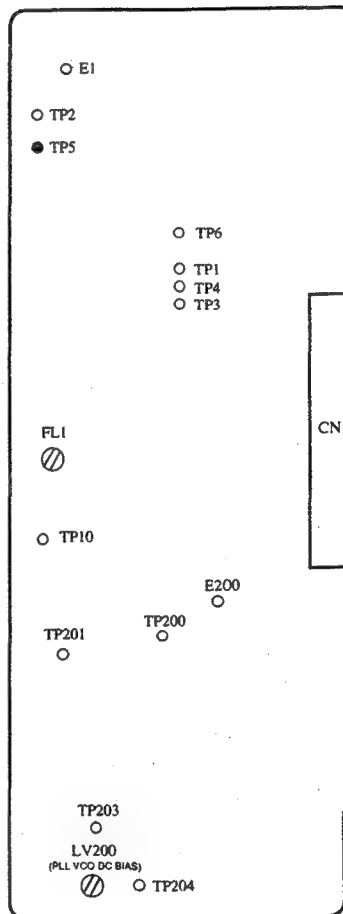
TRIG : INT



HIC (IC2)
(COMPONENT SIDE)
—On the VDA-11/11P Board—



VDA-11P BOARD(SOLDERING SIDE)



VDA-11P BOARD(COMPONENT SIDE)

8-5-14. Y REF Sync Position Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

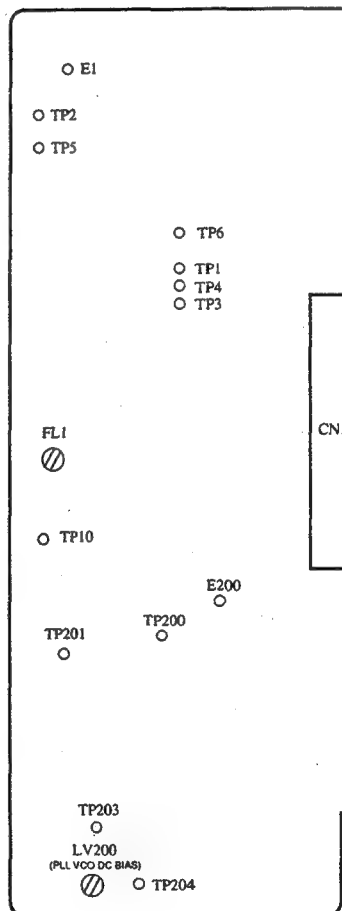
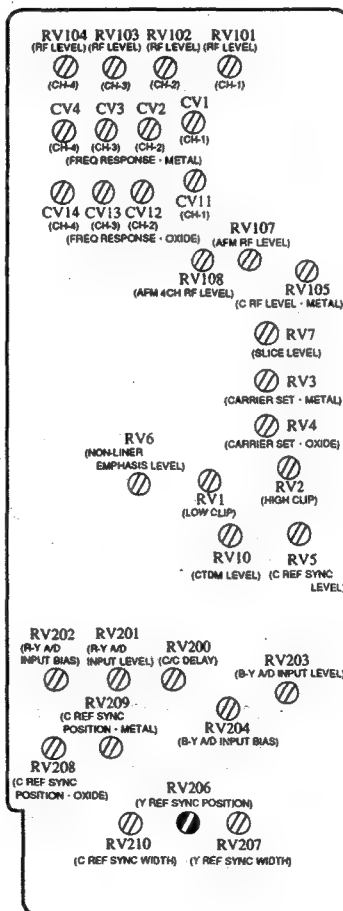
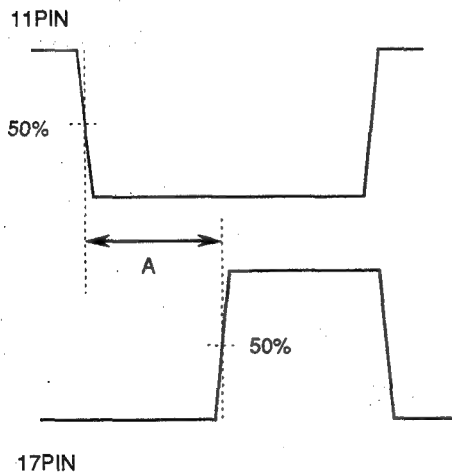
Board: VDA-11P board

• Preparation

- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP11/Extension board
TP17/Extension board
- Adj. point : RV206 (Y REF SYNC POSITION)/VDA-11P
- Spec. : $A = 2.65 \pm 0.02 \mu \text{ sec}$



8-5-15. Y REF Sync Pulse Width Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

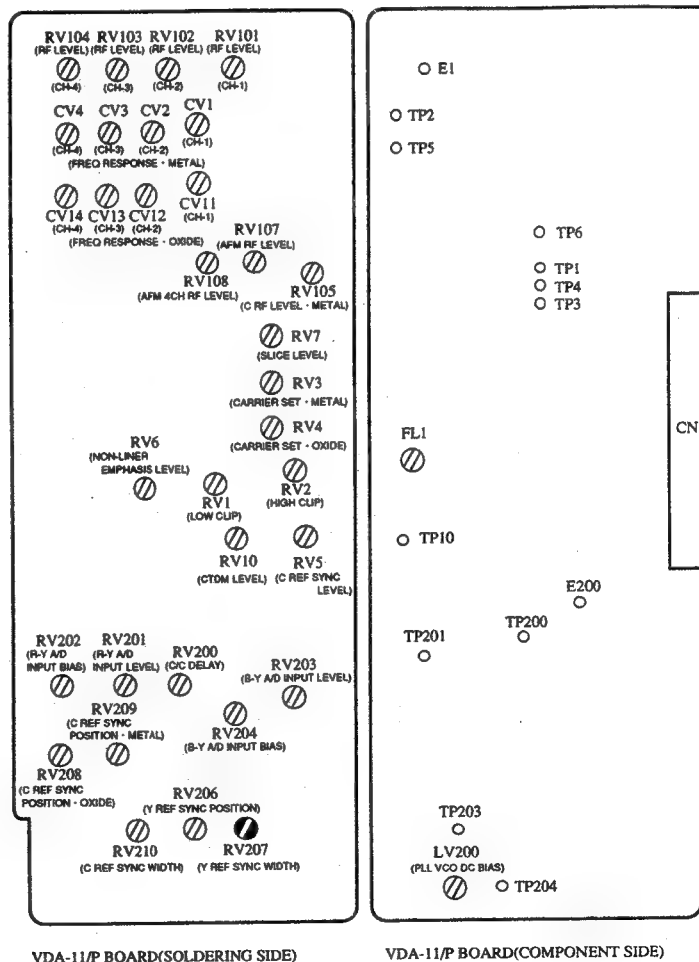
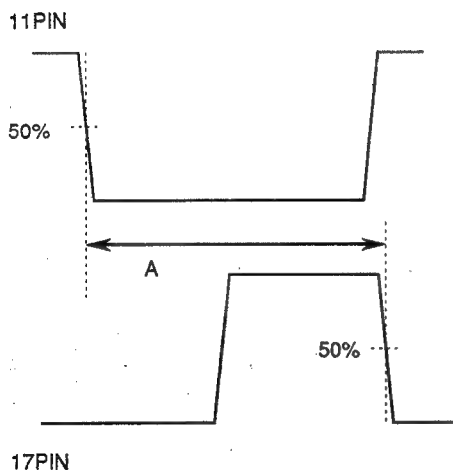
Board: VDA-11P board

• Preparation

- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP11/Extension board
TP17/Extension board
- Adj. point : ●RV207 (Y REF SYNC WIDTH)/VDA-11P
- Spec. : $A = 5.00 \pm 0.05 \mu \text{ sec}$



8-5-16. Y Input Level Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

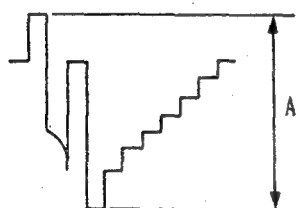
Board: AFM-6P board

• Preparation

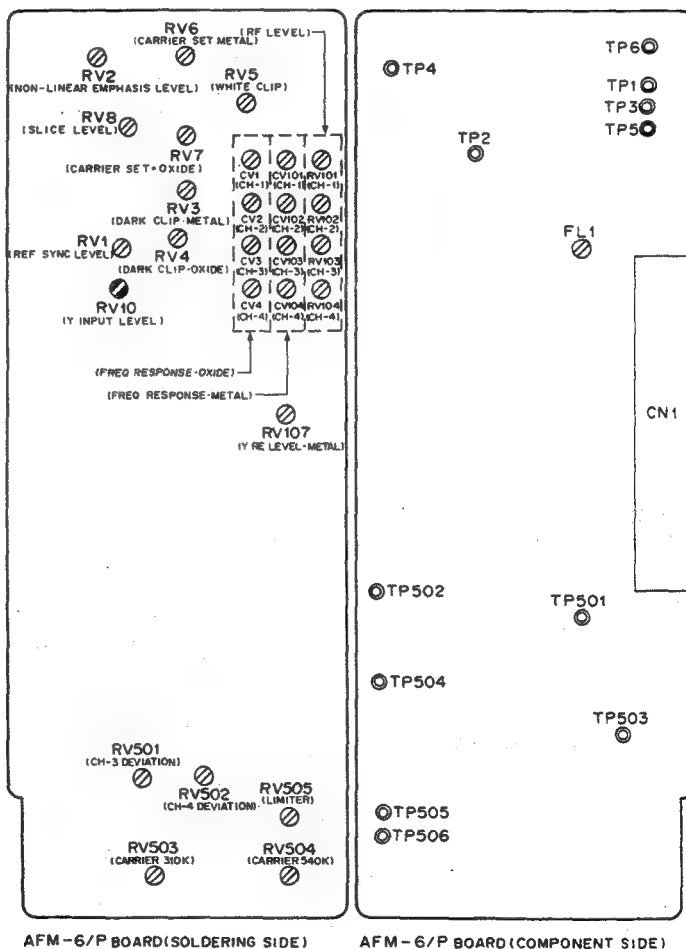
- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP5/AFM-6P
- Adj. point : RV10 (Y INPUT LEVEL)/AFM-6P
- Spec. : $A=1.0\pm0.02V$



TRIG : INT



VIDEO SYSTEM ALIGNMENT

8-5-17. Y REF Sync Level Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

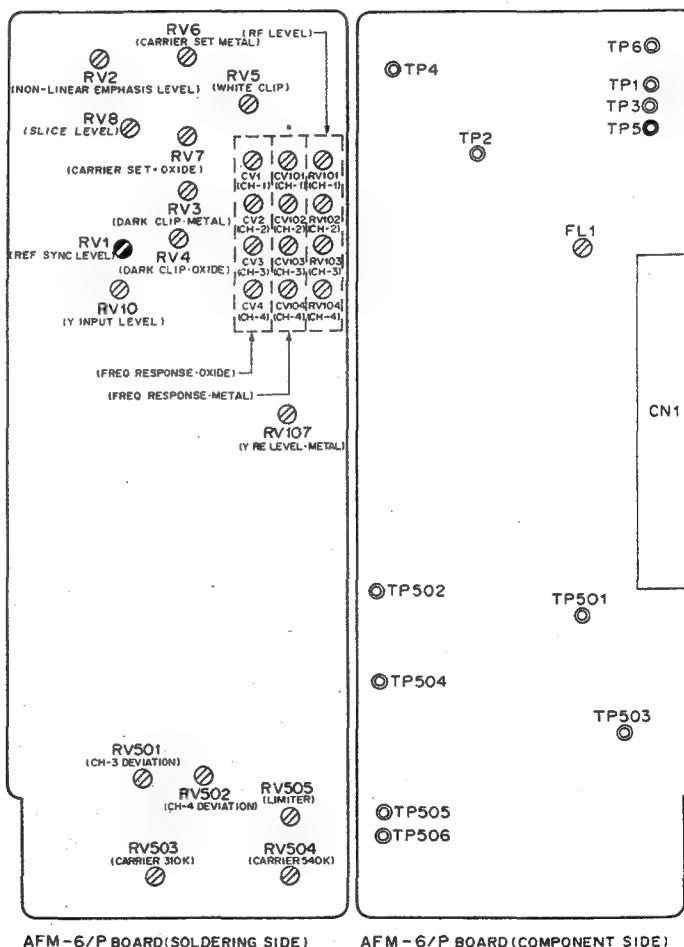
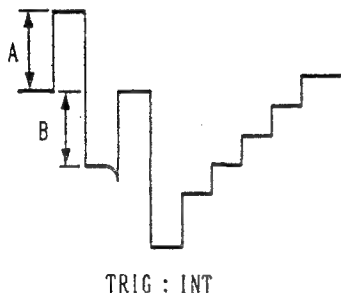
Board: AFM-6P board

• Preparation

- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP5/AFM-6P
- Adj. point : ●RV1 (REF SYNC LEVEL)/AFM-6P
- Spec. : A:B=100:125±2.5%



8-5-18. Y REF Sync Slant Adjustment

- Setting


Equipment: Dualtrace Oscilloscope

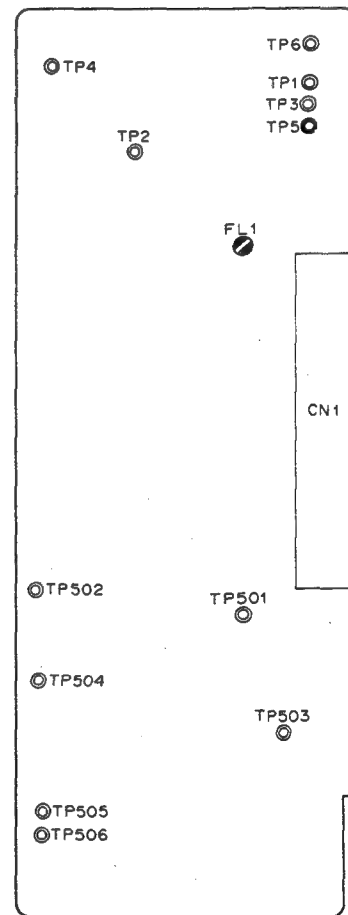
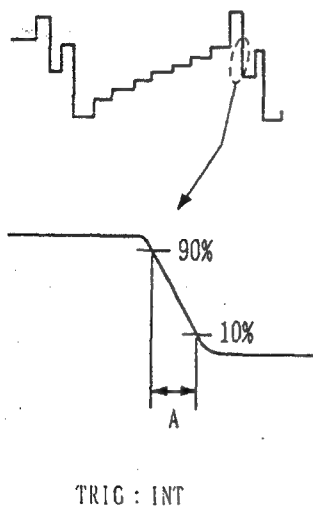
Board: AFM-6P board

- Preparation

- Built-in-color-bar
- Insert the BCT-20M and put the unit into the REC mode.

- Adjustment procedures

- Test point : TP5/AFM-6P
- Adj. point :  FL1/AFM-6P
- Spec. : $A=180\pm20\text{nsec}$



AFM-6/P BOARD (COMPONENT SIDE)

8-5-19. Y Carrier/Deviation Adjustment

1) Adjustment using Spectrum Analyzer

Step 1

• Setting

Equipment: Spectrum Analyzer

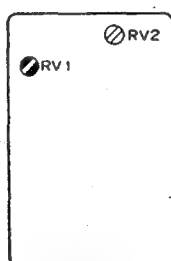
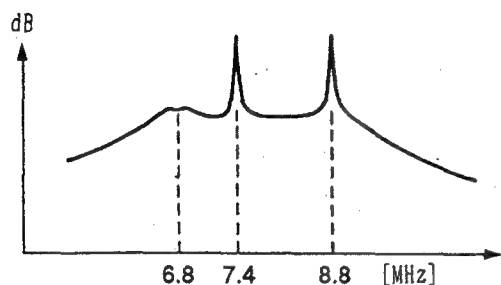
Board: AFM-6P board

• Preparation

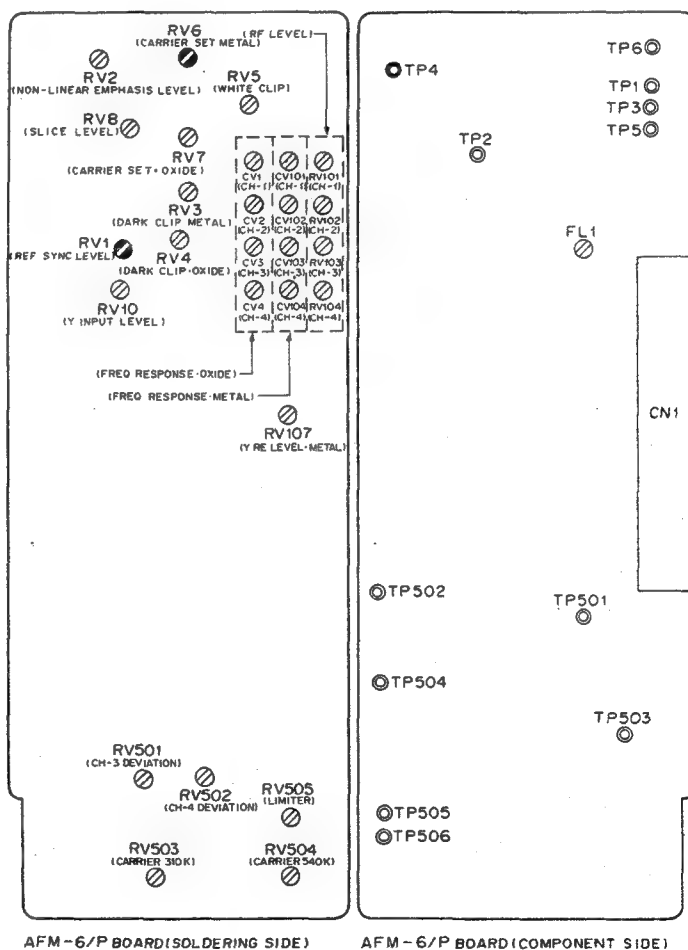
- Input signal: Color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP4/AFM-6P
- Adj. point : Sync tip carrier adjustment
 ●RV6 (CARRIER SET METAL)/AFM-6P
 : Deviation adjustment
 ●RV1 (IC1)/AFM-6P
- Spec. : Sync tip carrier adjustment
 Set the left side peak level to 6.8MHz.
 : Deviation adjustment
 Set the gap between two peaks to 1.4MHz.



HIC (IC 1)
(COMPONENT SIDE)
- On the AFM-6/P Board -



Step 2

• Setting

Equipment: Spectrum Analyzer

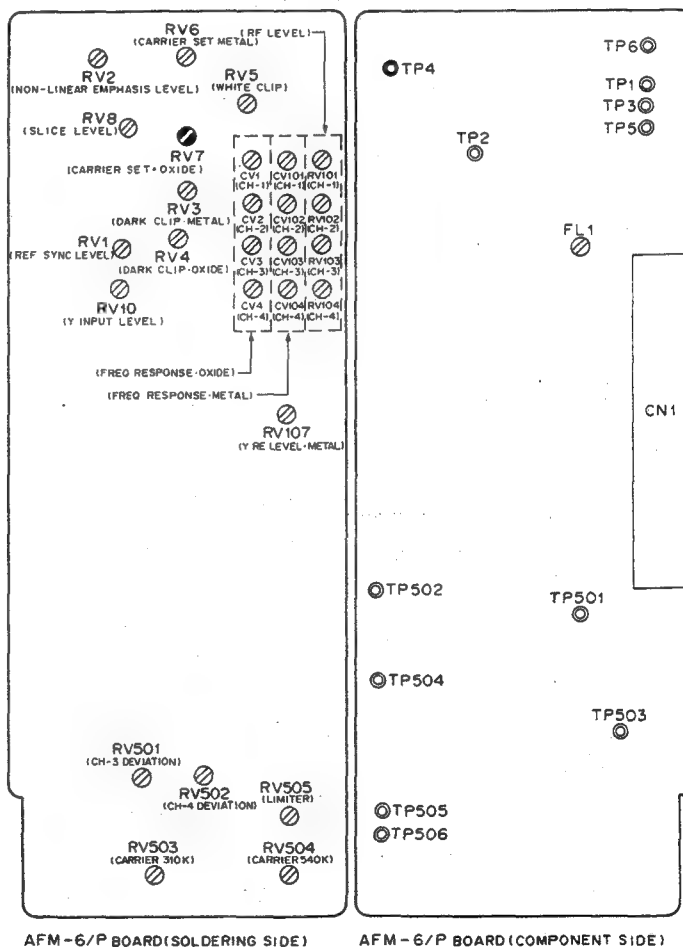
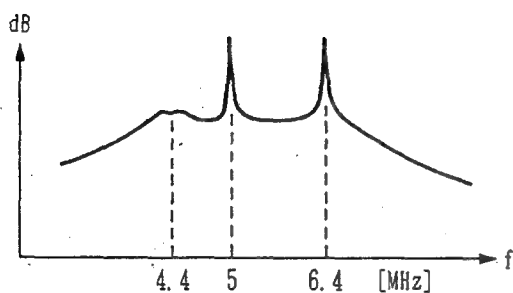
Board: AFM-6P board

• Preparation

- Input signal: Color-bar
- Insert the BCT-20G and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP4/AFM-6P
- Adj. point : Sync tip carrier adjustment
 ● RV7 (CARRIER SET OXIDE)/AFM-6P
- Spec. : Sync tip carrier adjustment
 Set the left side peak level to 4.4 MHz.



2) Adjustment Using Deviation Checker

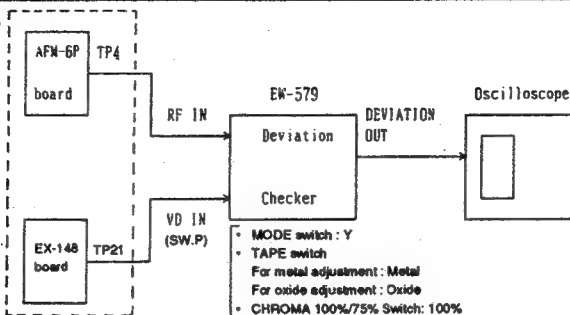
• Setting

Equipment: Dualtrace Oscilloscope

Board: AFM-6P board

• Connection

BVW-300AP

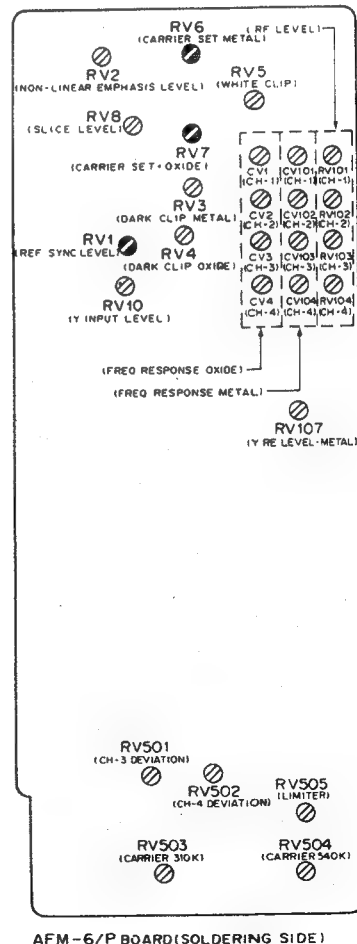
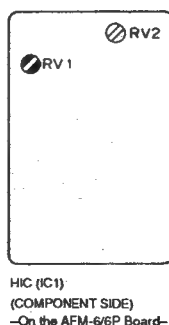
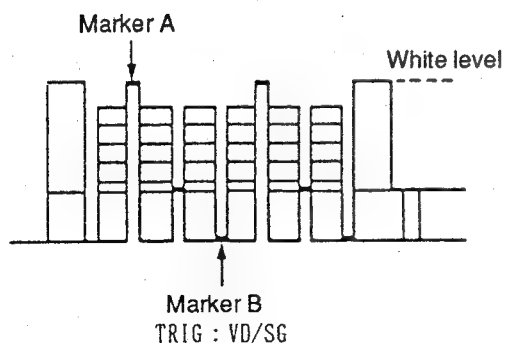


• Preparation

- Built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.
- After metal adjustment is completed, insert the BCT-20G and put the unit into the REC mode.

• Adjustment procedures

- Test point : DEVIATION OUT (DEVIATION CHECKER)
- Adj. point : METAL
Marker B adjustment (CARRIER SETTING)
● RV6 (CARRIER SET)/AFM-6P
Marker A adjustment (DEVIATION)
● RV1 (IC1)/AFM-6P
: OXIDE
Marker B adjustment (CARRIER SETTING)
● RV7 (CARRIER SET)/AFM-6P
- Spec. : Procedure
1. Set marker B to the sync tip level.
2. Set marker A to the white peak level.
3. Set oxide marker B to the sync tip level.



8-5-20. Y Dark Clip Adjustment

• Setting

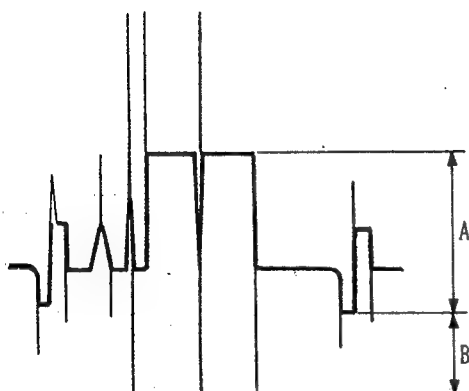
Equipment: Dualtrace Oscilloscope	Board: AFM-6P board
-----------------------------------	---------------------

• Preparation

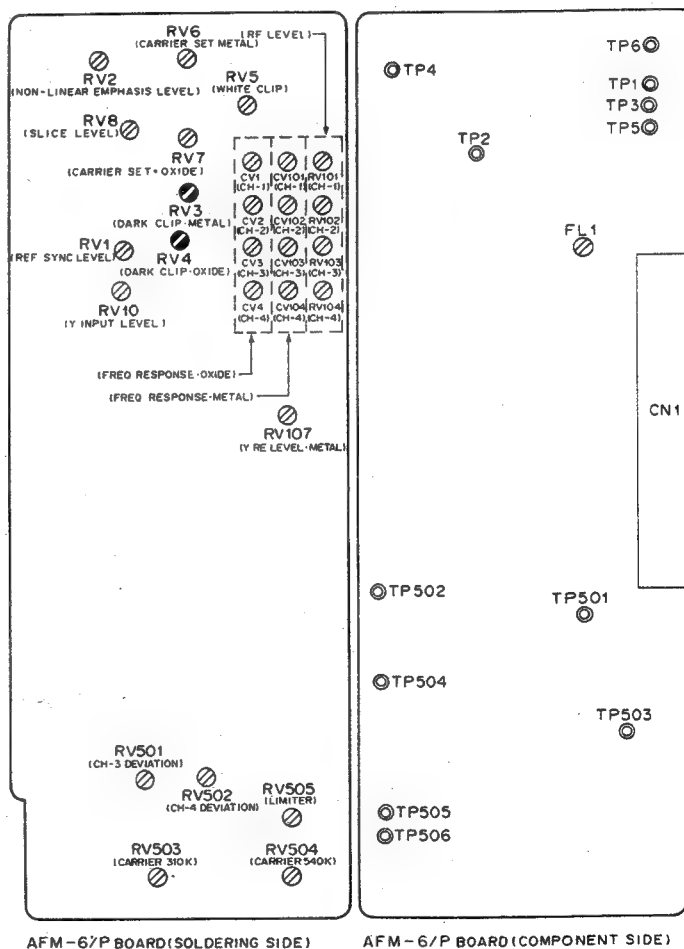
- Y input signal: H sweep (Sweep signal 820mV and sync signal 285mV/75-ohms termination)
- TP9/Extension board: AFM-6P
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP2/AFM-6P
- Adj. point : \odot RV3 (DARK CLIP METAL)
/AFM-6P
 \odot RV4 (DARK CLIP OXIDE)
/AFM-6P
- Spec. : $B = A \times 150 \pm 2.5\%$ (METAL)
 $B = A \times 65 \pm 2.5\%$ (OXIDE)



TRIG : HD/SG



AFM-6P BOARD (SOLDERING SIDE)

AFM-6P BOARD (COMPONENT SIDE)

8-5-21. Y White Clip Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

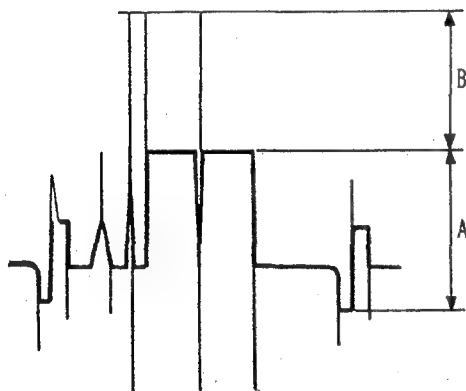
Board: AFM-6P board

• Preparation

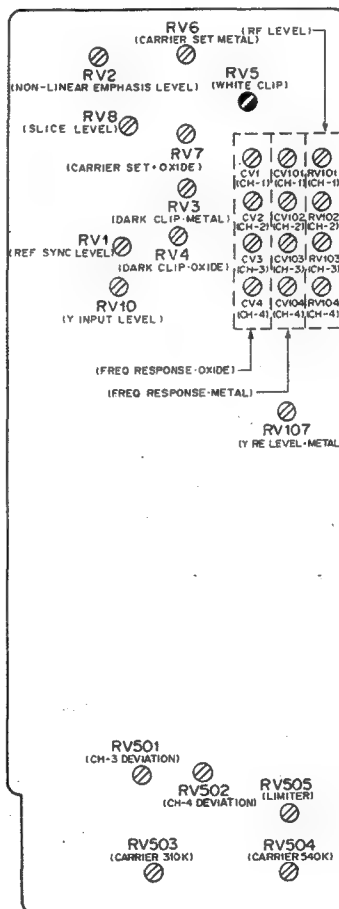
- Input signal: MOD pulse and bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

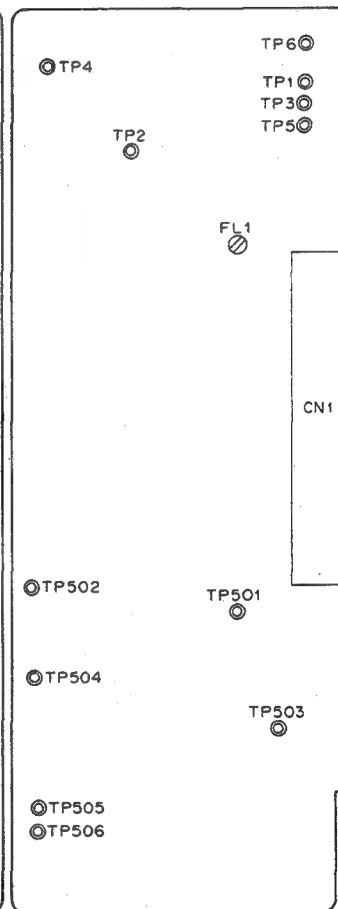
- Test point : TP2/AFM-6P
- Adj. point : ● RV5 (WHITE CLIP) /AFM-6P
- Spec. : A = VS level
B = $A \times 130 \pm 2.5\%$



TRIG : HD/SG



AFM-6/P BOARD (SOLDERING SIDE)



AFM-6/P BOARD (COMPONENT SIDE)

8-5-22. Y Nonlinear Emphasis Level Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

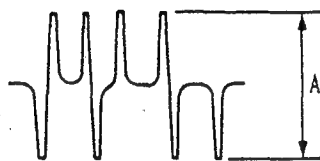
Board: AFM-6P board

• Preparation

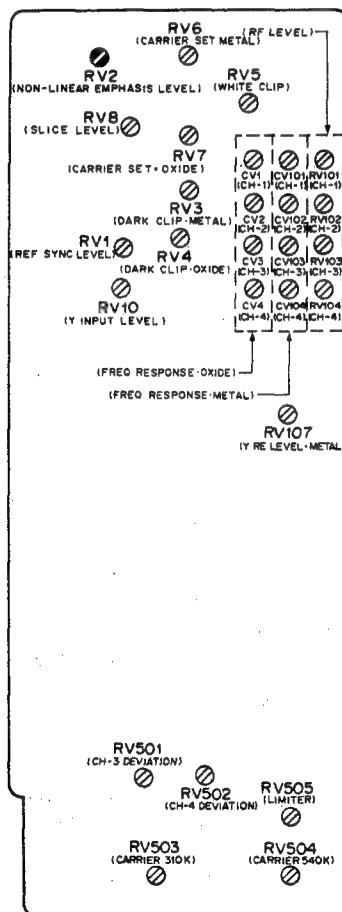
- Input signal: MOD pulse and bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

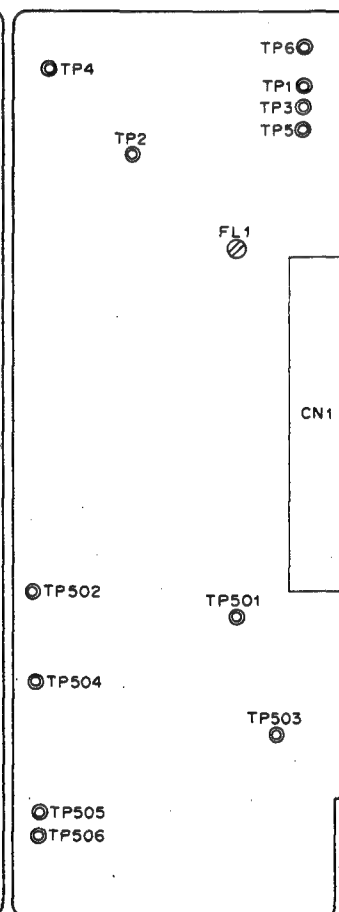
- Test point : TP3/AFM-6P
- Adj. point : ● RV2 (NON-LINEAR EMPHASIS)/AFM-6P
- Spec. : $A = 90 \pm 2\text{mV}$



TRIG : HD/SG



AFM-6P BOARD (SOLDERING SIDE)



AFM-6P BOARD (COMPONENT SIDE)

o VTR SYSTEM ALIGNMENT

8-5-23. Y REC HF Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

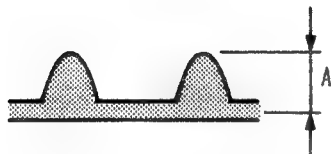
Board: AFM-6P board

• Preparation

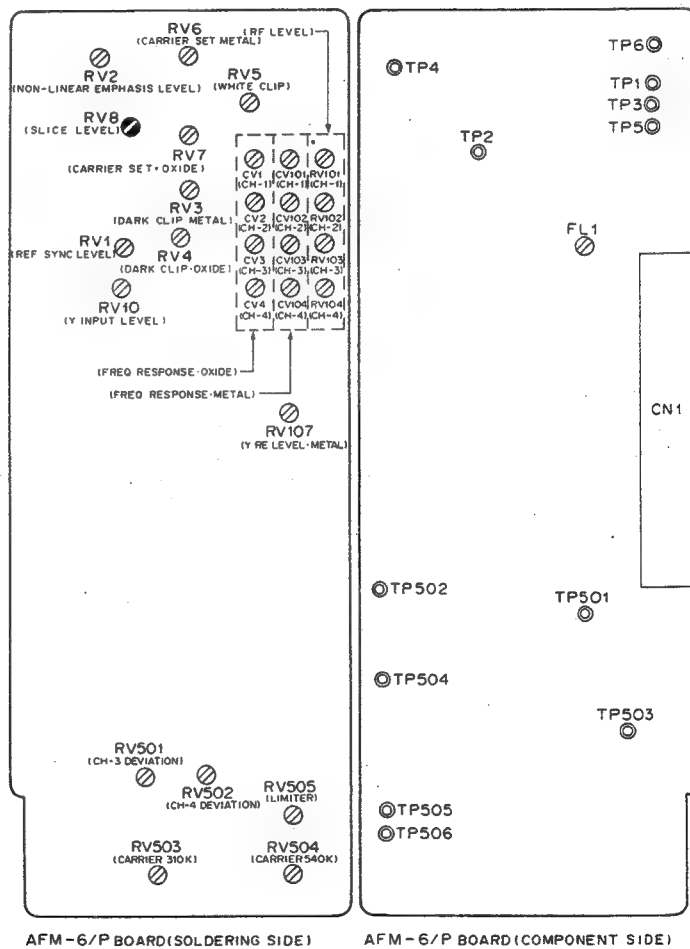
- Y input signal: H sweep (Sweep signal 820mV and sync signal 285mV/75-ohms termination)
TP9/Extension board: AFM-6P
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP6/AFM-6P
- Adj. point : \odot RV8 (SLICE LEVEL)/AFM-6P
- Spec. : $A = 150 \pm 5\text{mV}$
(Measured at the waveform center.)



TRIG: LINE



8-5-24. Y MOD Carrier Balance Adjustment

• Setting

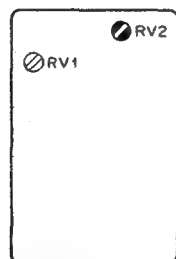
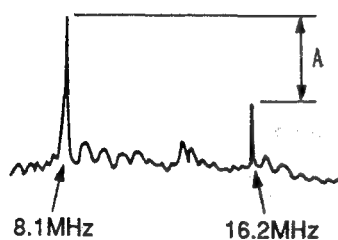
Equipment: Spectrum Analyzer	Board: AFM-6P board
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• Preparation

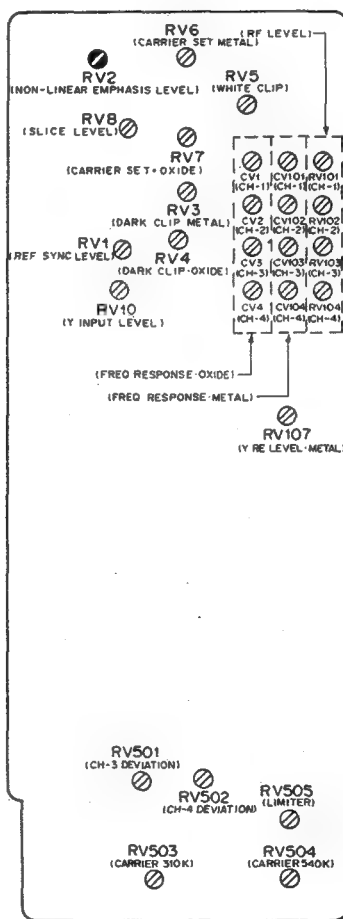
- Input signal: 50% flat field
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

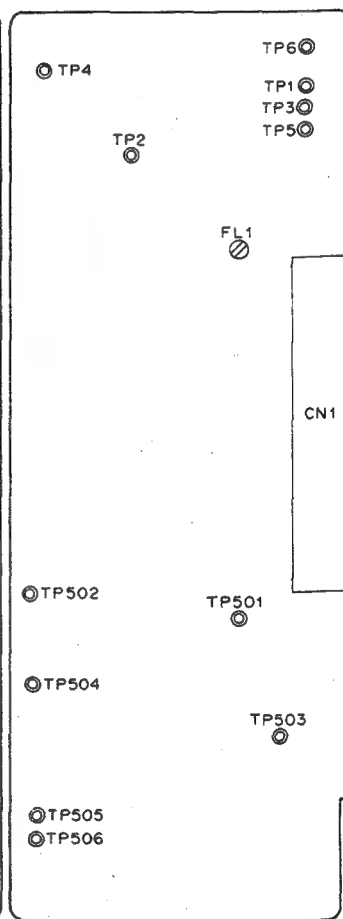
- Test point : TP4/AFM-6P
- Adj. point : ● RV2 (IC1)/AFM-6P
- Spec. : Minimize the level at 14MHz.
(A = 40dB or more)



HIC (IC1)
(COMPONENT SIDE)
—On the AFM-6P Board—



AFM-6P BOARD (SOLDERING SIDE)



AFM-6P BOARD (COMPONENT SIDE)

8-5-25. Y REC Current Tentative Adjustment (Oxide)

• Setting

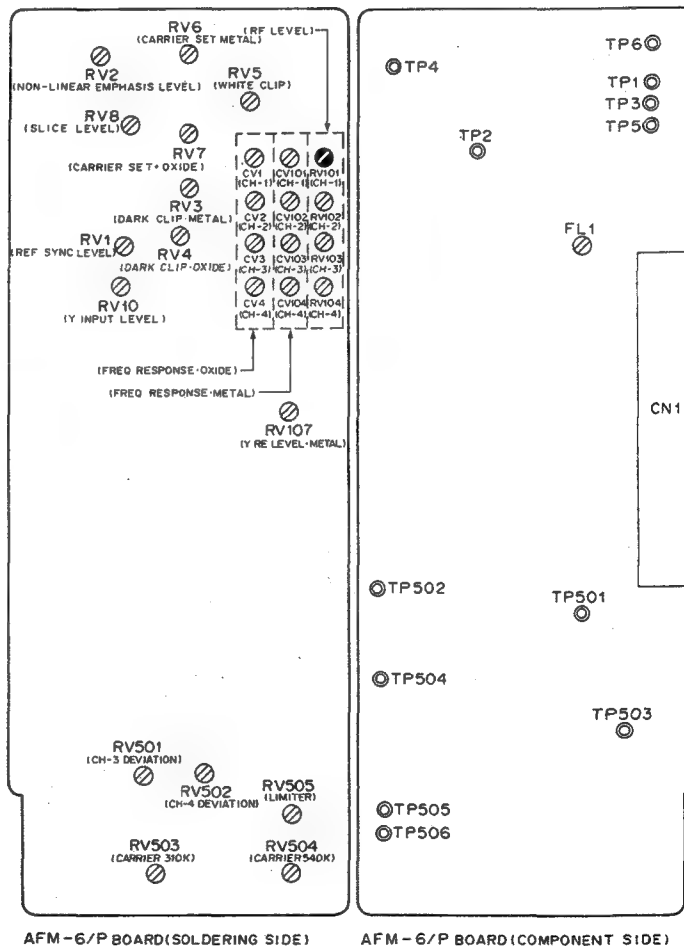
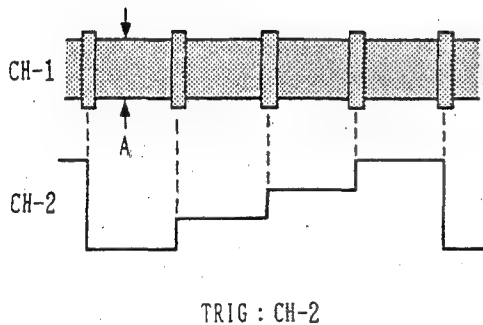
Equipment: Dualtrace Oscilloscope	Board: AFM-6P board
-----------------------------------	---------------------

• Preparation

<ul style="list-style-type: none"> Input signal: 50% flat field Insert the BCT-20G and put the unit into the REC mode.
--

• Adjustment procedures

- Test point : CH1: TP32/Extension board
CH2: TP7/Extension board
- Adj. point : ●RV101 (CH-1 RF LEVEL)
/AFM-6P
- Spec. : $A = 800 \pm 20\text{mV}$



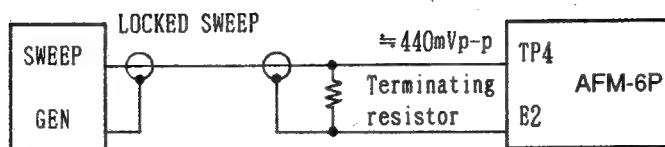
8-5-26. Y REC Current Frequency Response Adjustment (Oxide)

• Setting

Equipment: Dualtrace Oscilloscope

Board: AFM-6P board

• Connection



• Preparation

- Remove short-housing CNJ2 on the AFM-6P board, connect the Sweep Signal Generator between TP4 on the AFM-6P board and E2 on the AFM-6P board and supply a locked sweep signal.
- Insert the BCT-20G and put the unit into the REC PAUSE mode.
- After adjustment is completed, install short-housing CNJ2.

• Adjustment procedures

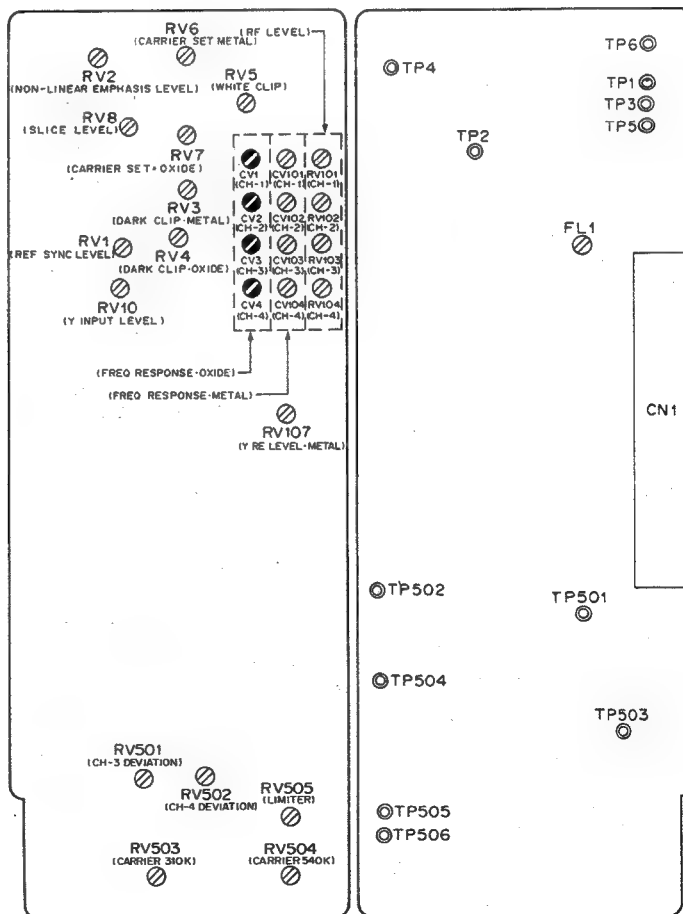
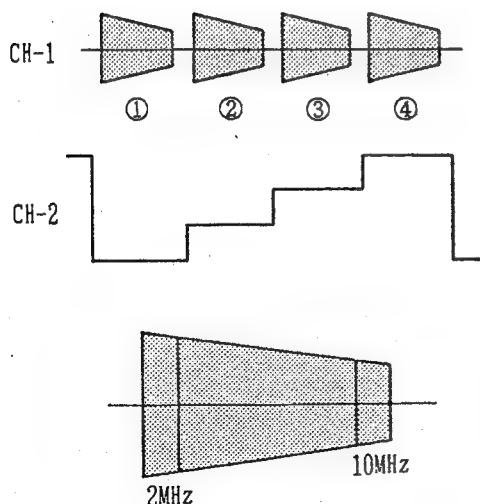
- Test point : CH-1 : TP32/Extension board
CH-2 : TP7/Extension board

- Adj. point : ① : CV1/AFM-6P
② : CV2/AFM-6P
③ : CV3/AFM-6P
④ : CV4/AFM-6P

• Spec.

frequency	level
2 MHz	100% reference
10 MHz	$90 \pm 5\%$ -15 %

TRIG: TP7/Extension board



AFM-6P BOARD (SOLDERING SIDE)

AFM-6P BOARD (COMPONENT SIDE)

8-5-27. Y REC Current Adjustment (Oxide)

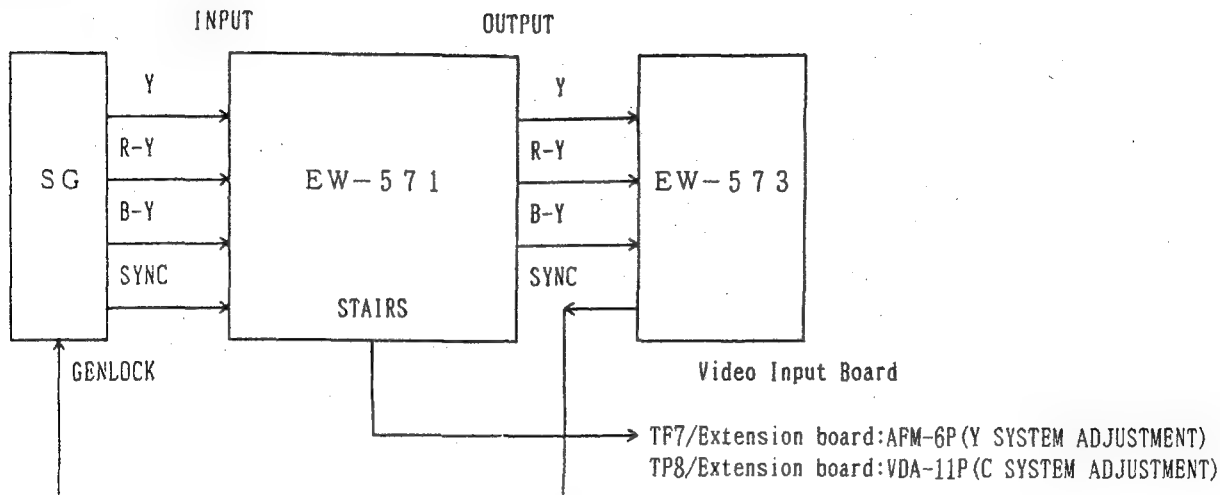
Step 1.

• Setting

Equipment: Dualtrace Oscilloscope	Board: AFM-6P board
-----------------------------------	---------------------

• Connection

REC CURRENT ADJ. TOOL

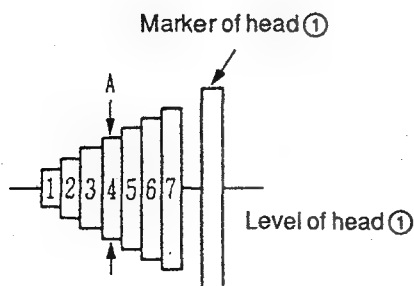


• Preparation

- Remove short-housing CNJ2 on the AFM-6P board and connect the RF OUT connector of the REC Current Adjustment Tool between TP4 on the AFM-6P board and E2 on the AFM-6P board.
- Insert the BCT-20G and put the unit into the REC PAUSE mode.
- Adjustment To II:
 AUTO/M ANU → AUTO
 NTSC/PAL → NTSC
 Y/C → Y
 METAL/OXIDE → OXIDE

• Adjustment procedures

- Test point : TP32/Extension board: AFM-6P
- Adj. point : RF LEVEL VR/REC CURRENT ADJUSTMENT TOOL
- Spec. : $A = 800 \pm 10\text{mV}$
(Fourth level)

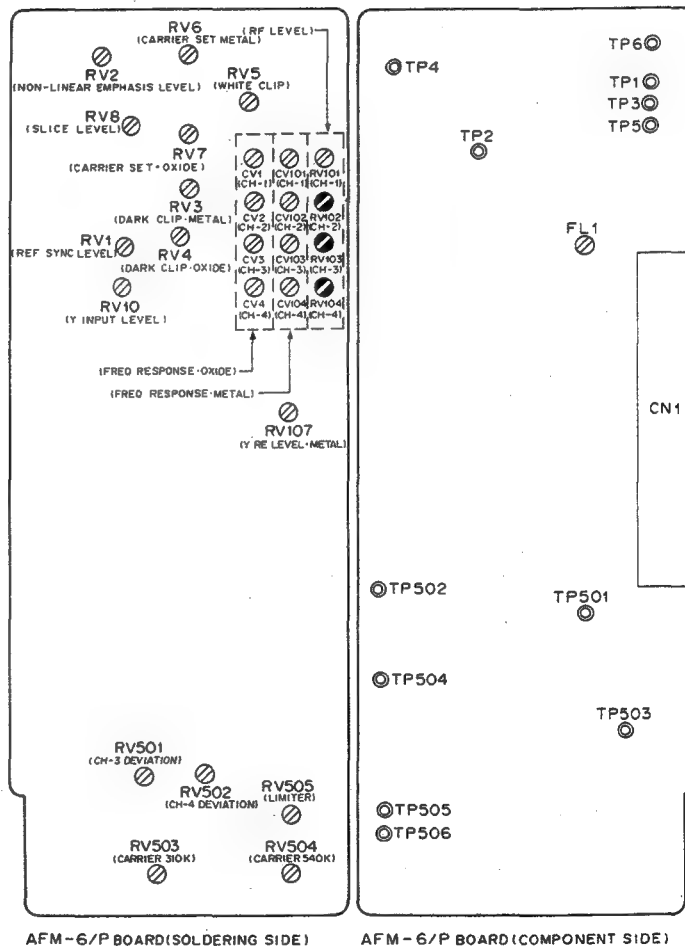


- Setting

Board: AFM-6P board

- Adjust so that the specified level is the same as in Step 1.
- Put the unit into the REC mode and record the signal on the tape.

- Test point : CH-1 : TP32/Extension board
CH-2 : TP7/Extension board
- Adj. point : HEAD② : ● RV102/AFM-6P
HEAD③ : ● RV103/AFM-6P
HEAD④ : ● RV104/AFM-6P
- Spec. :



Step 3

• Setting

Equipment: Dualtrace Oscilloscope

Board: VP-24P board

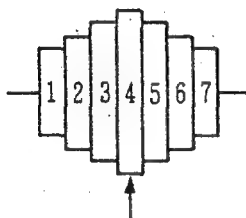
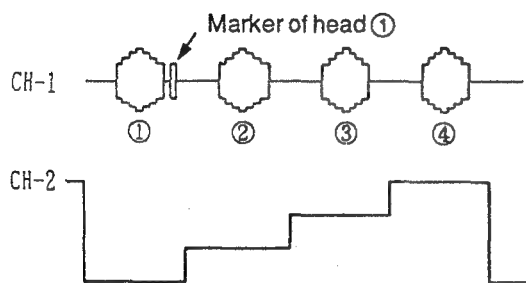
• Preparation

- Play back the recorded portion in step 2.
- Memorize the maximum level for every four heads (① through ④).

• Adjustment procedures

- Test point : CH-1 : TP33/Extension board :
VP-24P
CH-2 : TP25/Extension board :
VP-24P

• Spec: :



Check the maximum PB RF level.
* The illustrated fourth level is maximum.

• Note

- Remove a tool between TP4 and E2 and install short-housing CNJ2.

Step 4.

• Setting

Equipment: Dualtrace Oscilloscope

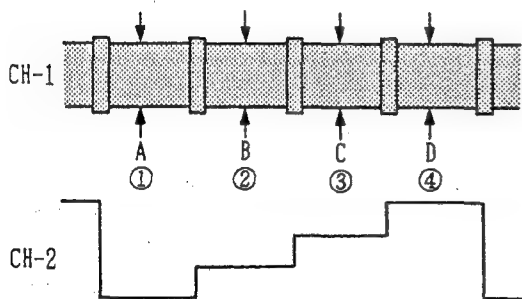
Board: AFM-6P board

• Preparation

- Input signal: 50% flat field
- Insert the BCT-20G and put the unit into the REC mode.

• Adjustment procedures

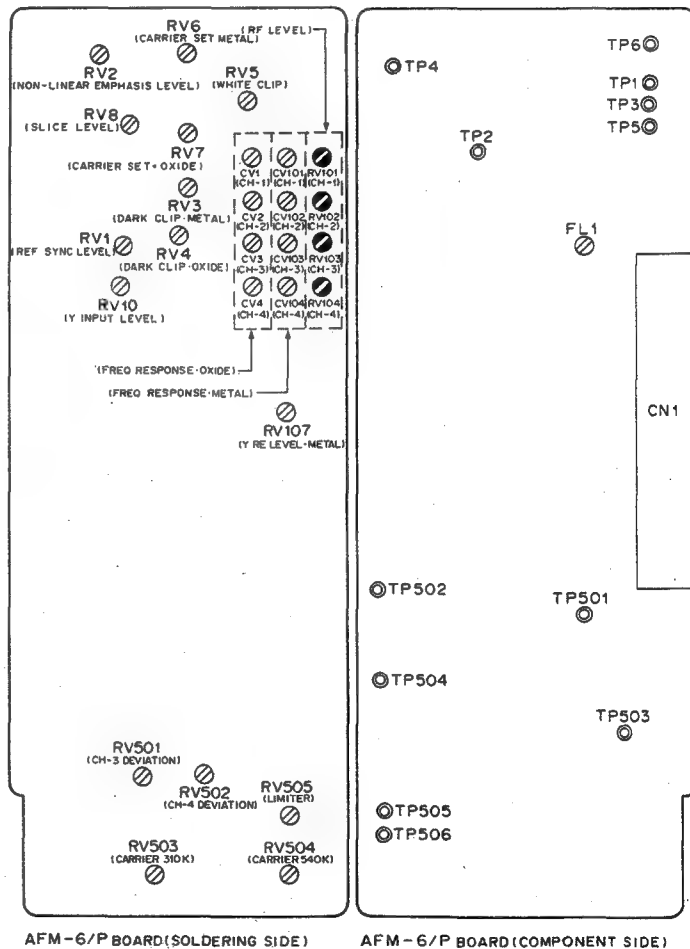
- Test point : CH-1 : TP32/Extension board
CH-2 : TP7/Extension board
- Adj. point : HEAD① : ● RV101/AFM-6P
HEAD② : ● RV102/AFM-6P
HEAD③ : ● RV103/AFM-6P
HEAD④ : ● RV104/AFM-6P
- Spec. : Adjust the voltage so that A, B, C, and D correspond to the maximum levels memorized in Step 3.



[Correspondence Table]

1	2	3	4	5	6	7
630	690	750	800	865	930	980

(mVp-p)



AFM-6/P BOARD(SOLDERING SIDE)

AFM-6/P BOARD(COMPONENT SIDE)

8-5-28. Y Frequency Response Check (Oxide)

• Setting

Equipment: Dualtrace Oscilloscope	Board:
-----------------------------------	--------

• Preparation

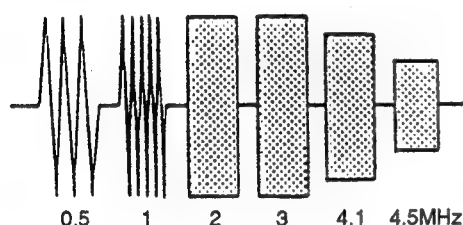
- Calculate the calibration value on the standard player (equivalent to BVW-75P).
Calibration Value = (Chart 1) - (CR5-2APS playback level)
- Playback the randomly recorded portions using the standard player BVW-300P.

1 MHz	100 %
2 MHz	98 %
3 MHz	90 %
4.1 MHz	73 %

Chart 1

• Adjustment procedures

CAV Y OUT/BVW-75P (or equivalent)



FREQUENCY	LEVEL
0.5MHz	100% (REFERENCE)
1MHz	(100-Calibration value)±5%
2MHz	(98-Calibration value) ^{+5 %} _{-7.5 %}
3MHz	(90-Calibration value) ^{+5 %} _{-10 %}
4.1MHz	(73-Calibration value) ^{+5 %} _{-18 %}

Measure the levels at the center of moire.

The level difference between the CH-1 and the CH-2 should be in the 5% or the less.

When the specification is not satisfied, re-adjust the Y recording current frequency response adjustment (Oxide) within the specification. After the adjustment, perform the Y recording current adjustment (Oxide).

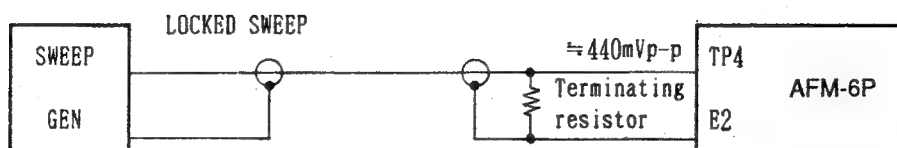
8-5-29. Y REC Current Frequency Response Adjustment (Metal)

• Setting

Equipment: Dualtrace Oscilloscope

Board: AFM-6P board

• Connection



• Preparation

- Remove short-housing CNJ2 on the AFM-6P board, connect the Sweep Signal Generator between TP4 on the AFM-6P board and E2 on the AFM-6 board, and supply a locked sweep signal.
- Insert the BCT-20M and put the unit into the REC mode.
- After adjustment is completed, install short-housing CNJ2.

• Adjustment procedures

• Test point : CH-1 : TP32/Extension board

CH-2 : TP7/Extension board

• Adj. point : ① CV101/AFM-6P

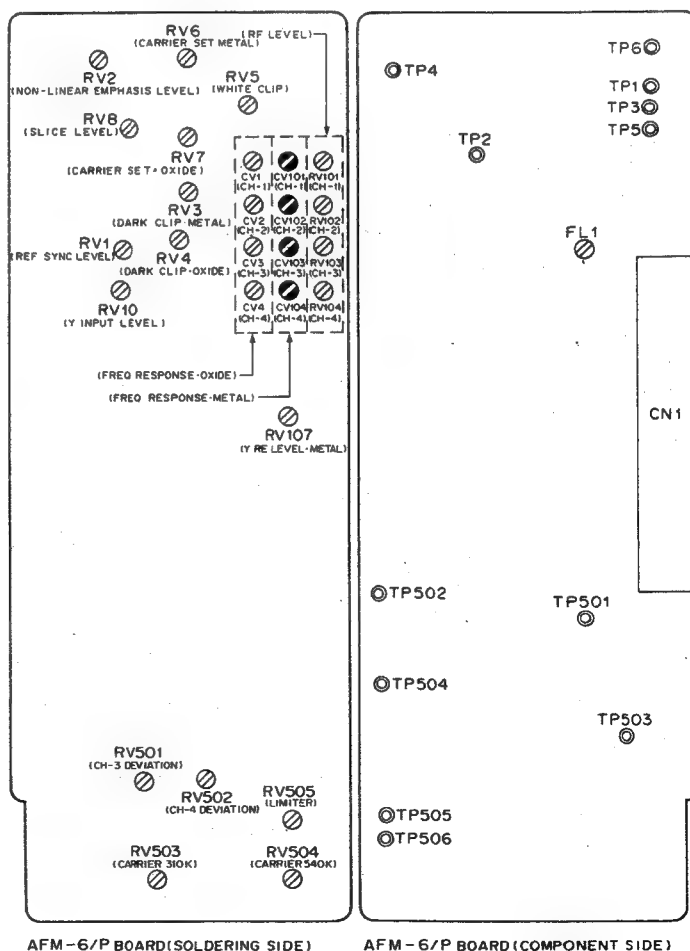
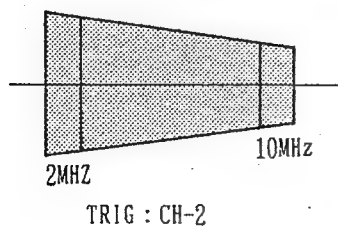
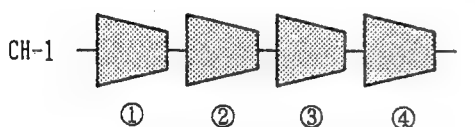
② CV102/AFM-6P

③ CV103/AFM-6P

④ CV104/AFM-6P

• Spec.

frequency	level
2 MHz	100% reference
10 MHz	$95 \pm 5\%$



AFM-6P BOARD(SOLDERING SIDE)

AFM-6P BOARD(COMPONENT SIDE)

8-5-30. Y REC Current Adjustment (Metal)

• Setting

Equipment: Dualtrace Oscilloscope

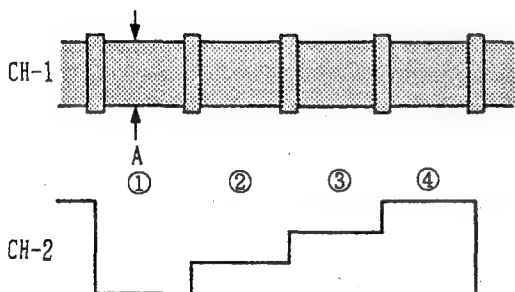
Board: AFM-6P board

• Preparation

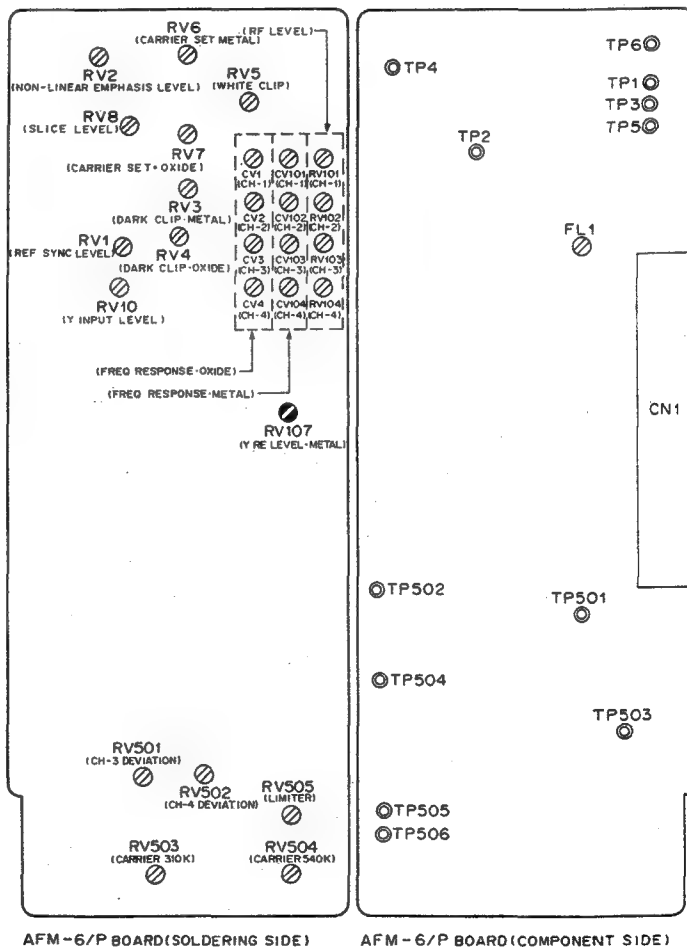
- Input signal: 50% flat field
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : CH-1 : TP32/Extension board
CH-2 : TP7/Extension board
- Adj. point : ● RV107 (Y RF LEVEL)/AFM-6P
- Spec. : Adjust so that A is two times as high as the level of head ① which is set in Step 4 of Sec. 8-5-25. Y REC Current Adjustment (Oxide).



The each level of the head ① through ④ should be less than 1.6V.



8-5-31. Y Frequency Response Check (Metal)

• Setting

Equipment: Dualtrace Oscilloscope	Board:
-----------------------------------	--------

• Preparation

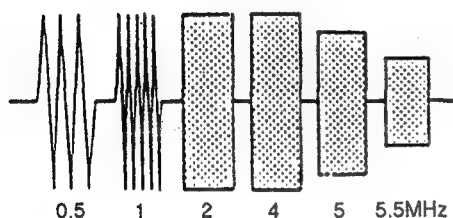
- Calculate the calibration value on the standard player (equivalent to BVW-75P).
Calibration Value = (Chart 1) - (CR5-1BPS playback level)
- Playback the randomly recorded portions using the standard player BVW-300P.

1 MHz	100 %
2 MHz	100 %
4 MHz	100 %
5 MHz	100 %
5.5 MHz	80 %

Chart 1

• Adjustment procedures

CAV Y OUT/BVW-75P (or equivalent)



FREQUENCY	LEVEL
0.5MHz	100% (REFERENCE)
1MHz	(100-Calibration value) $\pm 5\%$
2MHz	(100-Calibration value) $\pm 5\%$
4MHz	(100-Calibration value) $^{+2.5}_{-7.5}\%$
5MHz	(100-Calibration value) $^{+5}_{-7.5}\%$
5.5MHz	(85-Calibration value) $^{+10}_{-15}\%$

Measure the levels at the center of moire.

The level difference between the CH-1 and the CH-2 should be in the 5% or the less.

When the specification is not satisfied, re-adjust the Y recording current frequency response adjustment (Metal) within the specification. After the adjustment, perform the Y recording current adjustment (Metal).

8-5-32. C REC Current Tentative Adjustment (Oxide)

• Setting

Equipment: Dualtrace Oscilloscope

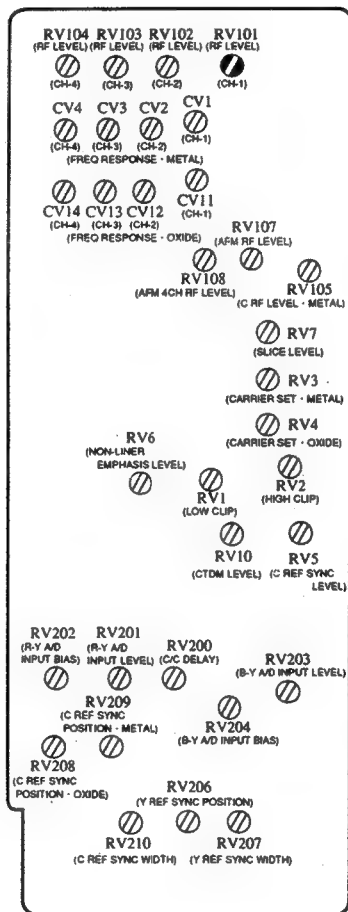
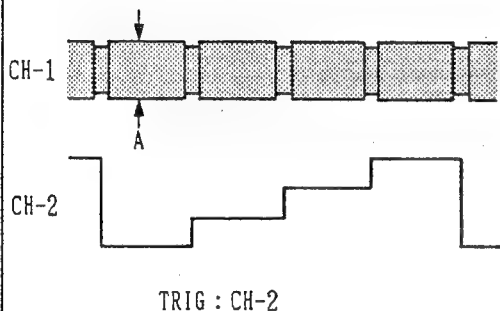
Board: VDA-11P board

• Preparation

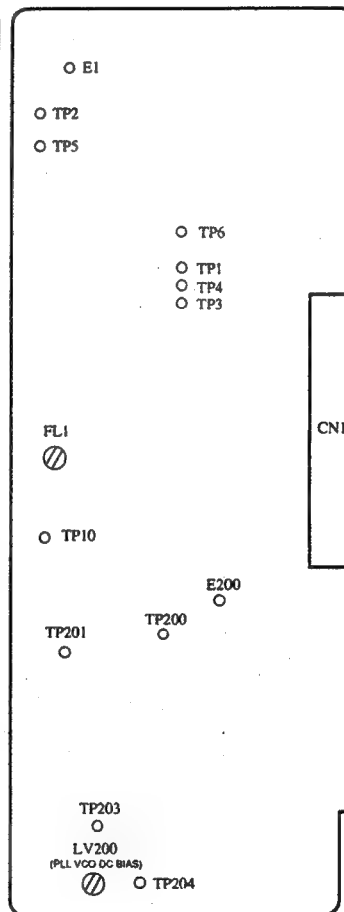
- Input signal: 0% flat field
- Insert the BCT-20G and put the unit into the REC mode.

• Adjustment procedures

- Test point : CH-1 : TP46/Extension board
CH-2 : TP8/Extension board
- Adj. point : ● RV101 (CH-1 RF LEVEL)
/VDA-11P
- Spec. : $A = 400 \pm 10 \text{ mV}$



VDA-11P BOARD(SOLDERING SIDE)



VDA-11P BOARD(COMPONENT SIDE)

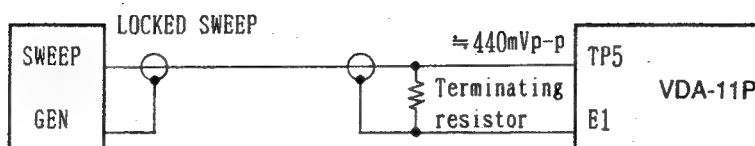
8-5-33. C REC Current Frequency Response Adjustment (Oxide)

• Setting

Equipment: Dualtrace Oscilloscope

Board: VDA-11P board

• Connection



• Preparation

- Remove short-housing CNJ2 on the VDA-11P board, connect the Sweep Signal Generator between TP5 on the VDA-11P board and E1 on the VDA-11P board, and supply a locked sweep signal.
- Insert the BCT-20G and put the unit into the REC PAUSE mode.

• Adjustment procedures

- Test point : CH-1 : TP46/Extension board

CH-2 : TP8/Extension board

- Adj. point : CH-1 : CV11/VDA-11P

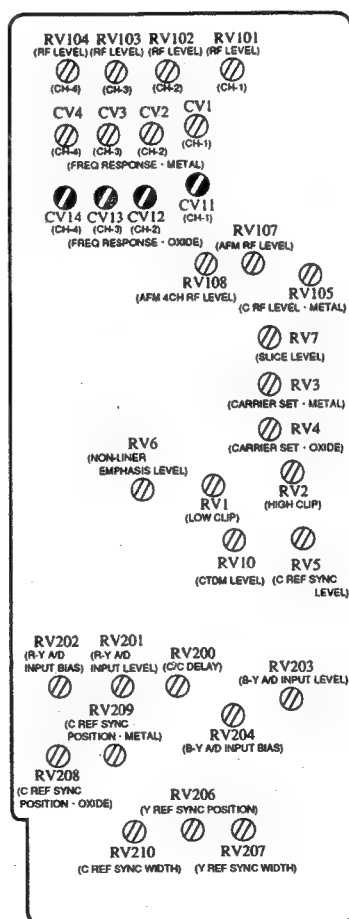
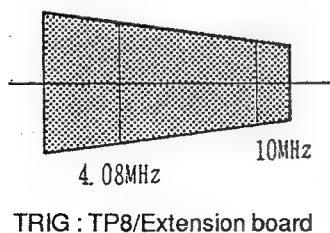
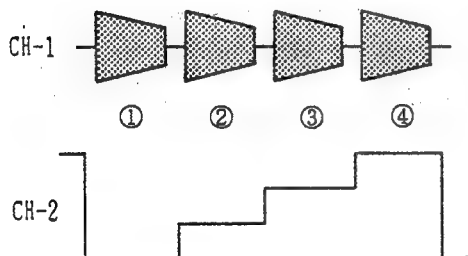
CH-2 : CV12/VDA-11P

CH-3 : CV13/VDA-11P

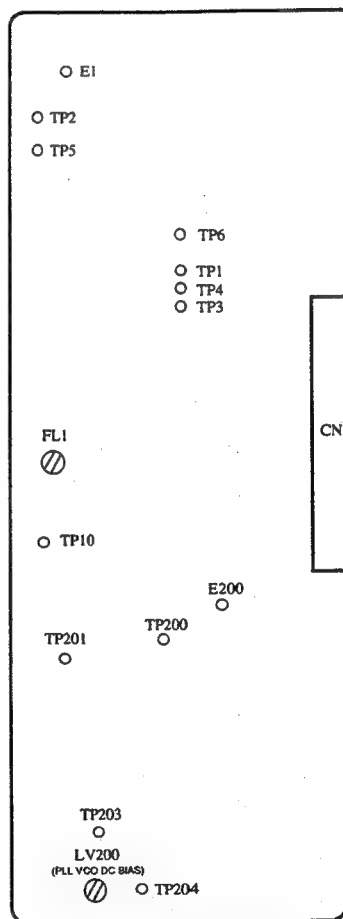
CH-4 : CV14/VDA-11P

- Spec.

frequency	level
3.93 MHz	100% reference
10 MHz	60 ±10%



VDA-11P BOARD(SOLDERING SIDE)



VDA-11P BOARD(COMPONENT SIDE)

• Note

- After adjustment is completed, install short-housing CNJ2.

8-5-34. C REC Current Adjustment (Oxide)

Step 1.

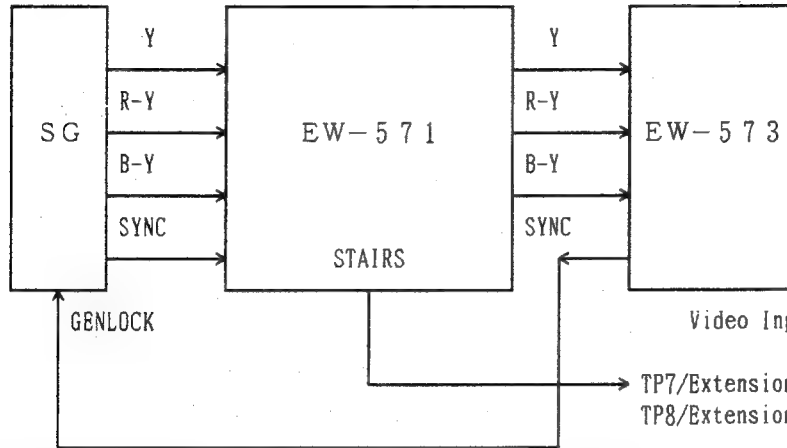
• Setting

Equipment: Dualtrace Oscilloscope	Board: VDA-11P board
-----------------------------------	----------------------

• Connection

REC CURRENT ADJ. TOOL INPUT

OUTPUT

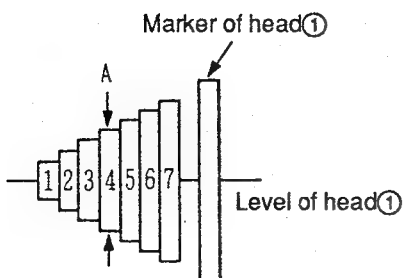


• Preparation

- Remove short-housing CNJ2 on the VDA-11P board and connect the RF OUT connector of the REC Current Adjustment Tool between TP5 on the VDA-11P board and E1 on the VDA-11P board.
- Insert the BCT-20K and put the unit into the REC PAUSE mode.
- Adjustment:
 - AUTO/MANU→AUTO
 - NTSC/PAL→NTSC
 - Y/C→C
 - METAL/OXIDE→OXIDE

• Adjustment procedures

- Test point : TP46/Extension board
- Adj. point : RF LEVEL VR/REC
Current Adjustment Tool
- Spec. : $A = 400 \pm 10 \text{ mV}$
(Fourth level)



Step 2.

• Setting

Equipment: Dualtrace Oscilloscope

Board: VDA-11P board

• Preparation

- Adjust so that the specified level is the same as in Step 1.
- Put the unit into the REC mode and record the signal in the tape.

• Adjustment procedures

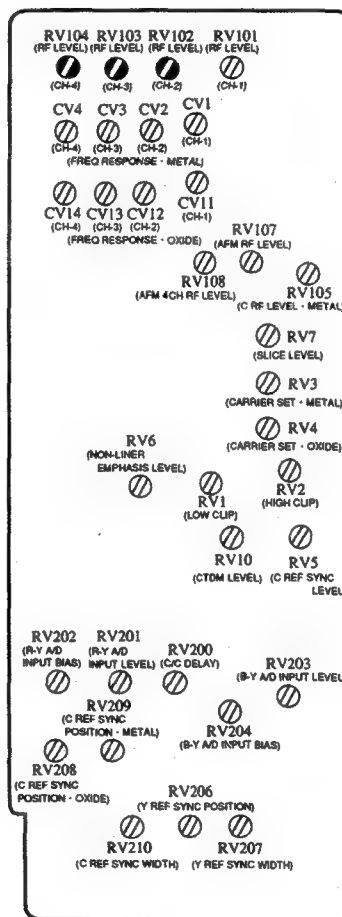
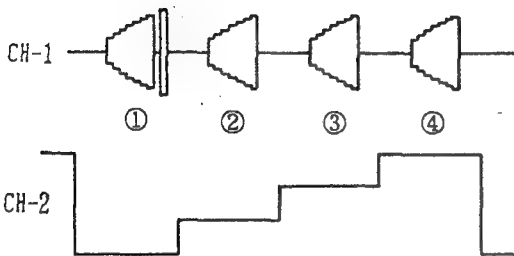
• Test point : CH-1 : TP46/Extension board

CH-2 : TP8/Extension board

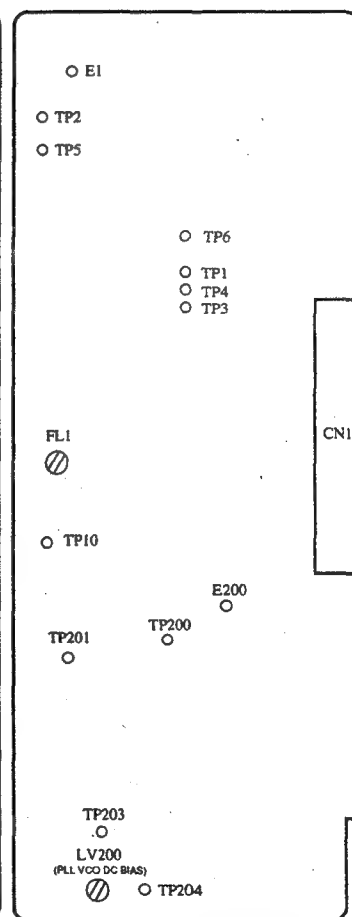
• Adj. point : HEAD② : ● RV102/VDA-11P

HEAD③ : ● RV103/VDA-11P

HEAD④ : ● RV104/VDA-11P



VDA-11/P BOARD(SOLDERING SIDE)



VDA-11/P BOARD(COMPONENT SIDE)

Step 3.

• Setting

Equipment: Dualtrace Oscilloscope	Board: VP-24P board
-----------------------------------	---------------------

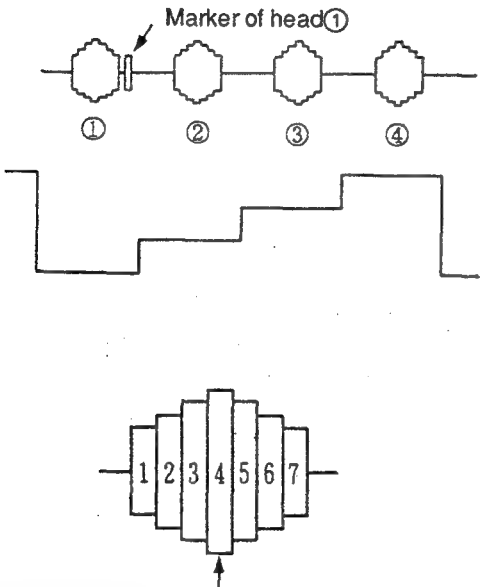
• Preparation

- Play back the recorded portion in Step 2.
- Memorize the maximum level for every four heads (① through ④)

• Adjustment procedures

• Test point : CH-1 : TP31/Extension board: VP-24P
CH-2 : TP25/Extension board: VP-24P

• Spec. :



Check the maximum PB RF level.
* The illustrated fourth level is maximum.

• Note

- Remove the tool between TP5 and E1 and install short-housing CNJ2.

- Setting

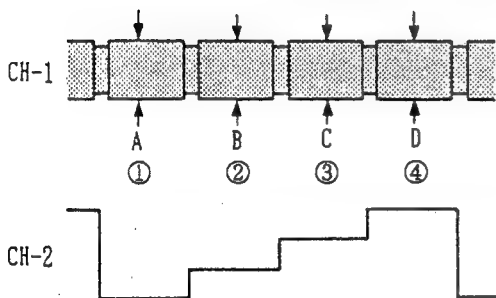
Equipment: Dualtrace Oscilloscope	Board: VDA-11P board
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- Preparation

- Input signal: 0% flat field
- Insert the BCT-20G and put the unit into the REC mode.

- Adjustment procedures

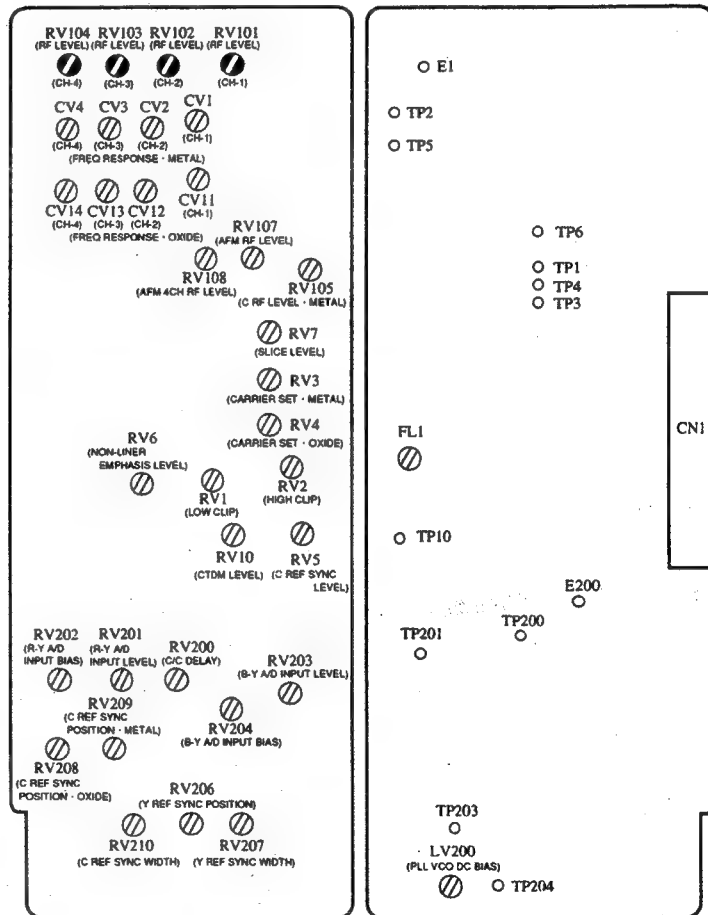
- Test point : CH-1 : TP46/Extension board
CH-2 : TP8/Extension board
- Adj. point : HEAD① : ② RV101/VDA-11P
HEAD② : ② RV102/VDA-11P
HEAD③ : ② RV103/VDA-11P
HEAD④ : ② RV104/VDA-11P
- Spec. : Adjust the voltage so that A,B,
C, and D correspond to the
maximum levels memorized in
Step 3.



[Correspondence Table]

1	2	3	4	5	6	7
310	340	370	400	430	475	500

(mVp-p)



VDA-11/P BOARD(SOLDERING SIDE)

VDA-11/P BOARD (COMPONENT SIDE)

UNITED STATES GOVERNMENT PRINTING OFFICE: 1964

8-5-35. C Frequency Response Check (Oxide)

• Setting

Equipment: Dualtrace Oscilloscope	Board:
-----------------------------------	--------

• Preparation

- Calculate the calibration value on the standard player (equivalent to BVW-75P).
Calibration Value = (Chart 1) - (CR5-2APS playback level)
- Playback the randomly recorded portions using the standard player BVW-300P.

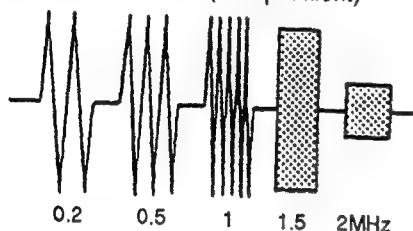
0.5 MHz	100 %
1 MHz	100 %
1.5 MHz	85 %

Chart 1

• Adjustment procedures

R-Y OUT/BVW-75P (or equivalent)

B-Y OUT/BVW-75P (or equivalent)



FREQUENCY	LEVEL
0.2MHz	100% (REFERENCE)
0.5MHz	(100-Calibration value) \pm 5%
1MHz	(100-Calibration value) \pm 5%
1.5MHz	(85-Calibration value) $^{+5}_{-15}$ %

- The level difference between the CH-1 and the CH-2 should be in the 5% or the less.
- When the specification is not satisfied, re-adjust the C recording current frequency response adjustment (Oxide) with the specification. After the adjustment, perform the C recording current adjustment (Oxide).

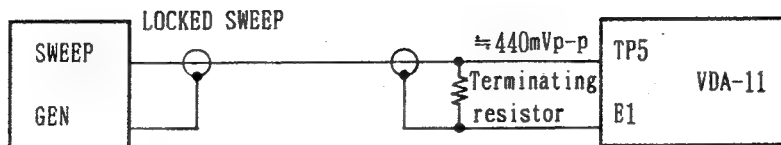
8-5-36. C REC Current Frequency Response Adjustment (Metal)

• Setting

Equipment: Dualtrace Oscilloscope

Board: VDA-11P board

• Connection



• Preparation

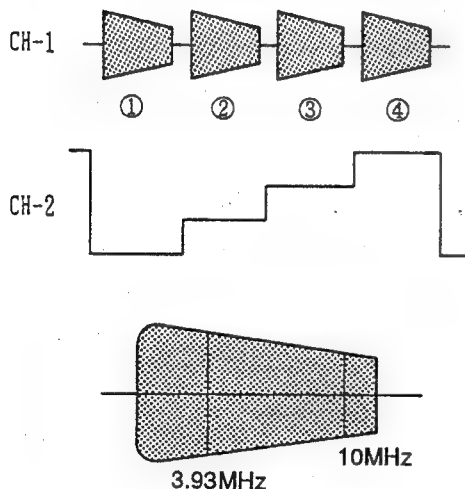
- Remove short-housing CNJ2 on the VDA-11P board, connect the Sweep Signal Generator between TP5 on the VDA-11P board and E1 on the VDA-11P board, and supply a locked sweep signal.
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : CH-1 : TP46/Extension board
CH-2 : TP8/Extension board

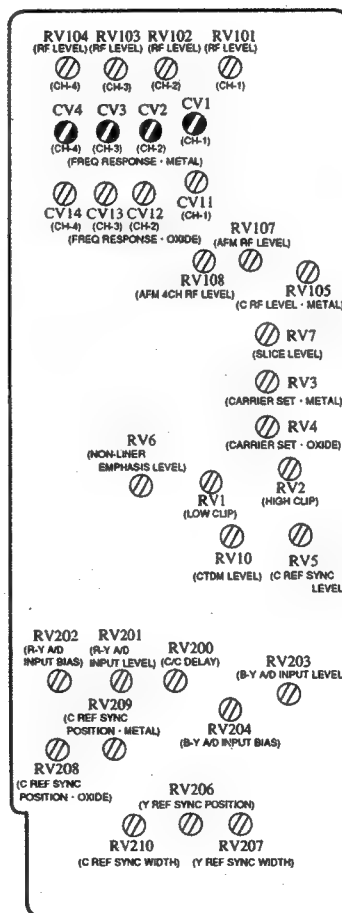
- Adj. point : ① : CV1/VDA-11P
② : CV2/VDA-11P
③ : CV3/VDA-11P
④ : CV4/VDA-11P

• Spec.

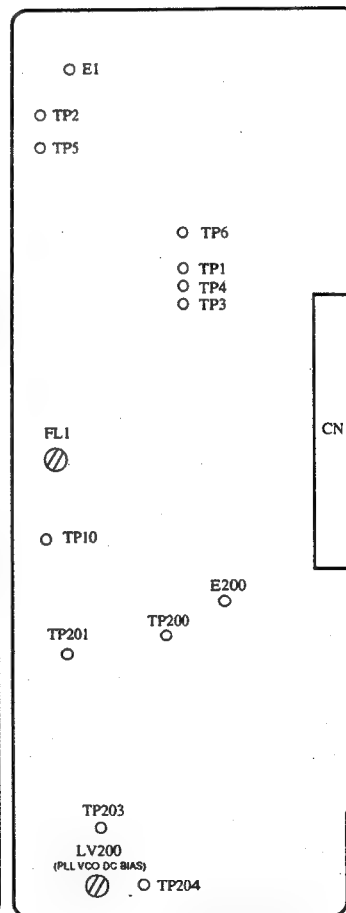


frequency	level
3.93 MHz	100% reference
10 MHz	65 ±10%

TRIG : CH-2



VDA-11P BOARD(SOLDERING SIDE)



VDA-11P BOARD(COMPONENT SIDE)

○ VTD SYSTEM ALIGNMENT

• Note

- After adjustment is completed, install short-housing CNJ2.

8-5-37. C REC Current Adjustment (Metal)

• Setting

Equipment: Dualtrace Oscilloscope

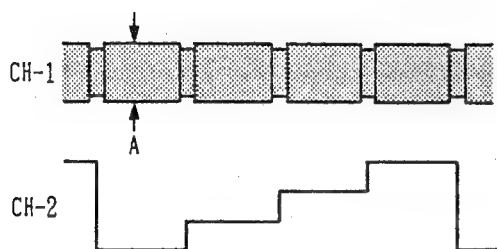
Board: VDA-11P board

• Preparation

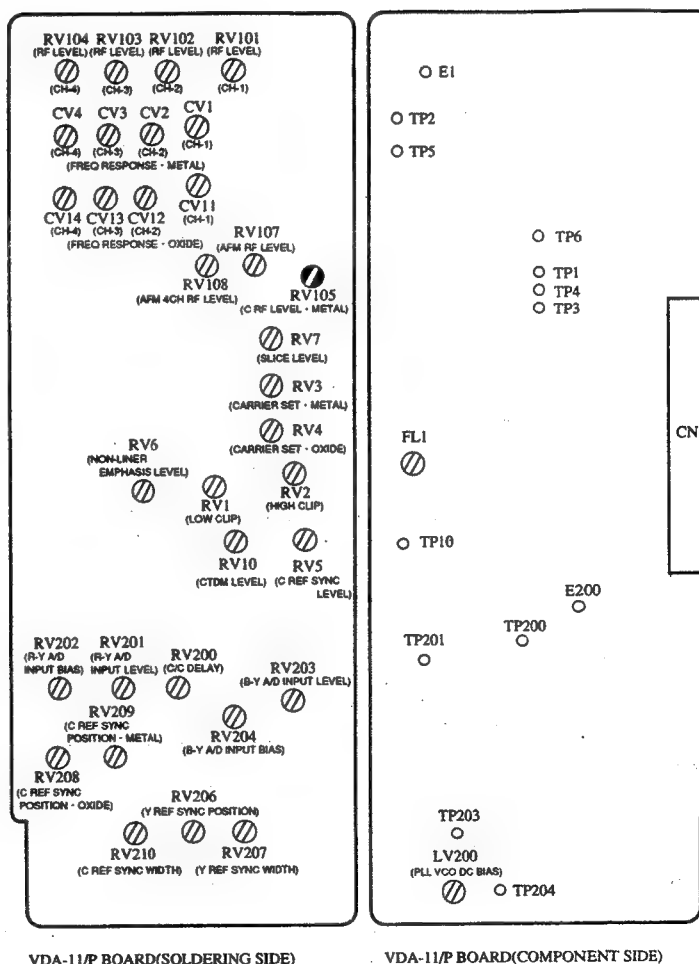
- Input signal: 0% flat field
- Connect a tantalum capacitor (1 to 10 μ F/16V) between TP35 and TP1, TP36 and TP2 on the Extension board. (TP1 and TP2 negative).
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : CH-1 : TP46/Extension board
CH-2 : TP8/Extension board
- Adj. point : \odot RV105 (C RF LEVEL)/VDA-11P
- Spec. : Adjust so that A is one point eight times as high as the level of head ① which is set in Step 4 of Sec. 8-5-32 C REC Current Adjustment (Oxide).



Note: The each level of the head ① through ④ should be less than 1.0V.



8-5-38. C Frequency Response Check (Metal)

• Setting

Equipment: Dualtrace Oscilloscope	Board:
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• Preparation

- Calculate the calibration value on the standard player (equivalent to BVW-75P).
Calibration Value = (Chart 1) - (CR5-1BPS playback level)
- Playback the randomly recorded portions using the standard player BVW-300P.

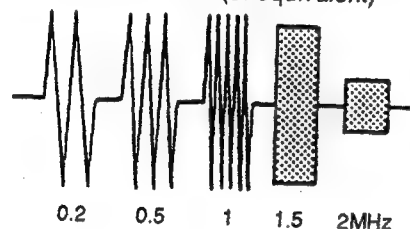
1 MHz	100 %
2 MHz	100 %
4 MHz	100 %

Chart 1

• Adjustment procedures

R-Y OUT/BVW-75P (or equivalent)

B-Y OUT/BVW-75P (or equivalent)



FREQUENCY	LEVEL
0.2MHz	100% (REFERENCE)
0.5MHz	(100-Calibration value) ±5%
1MHz	(100-Calibration value) ±5%
1.5MHz	(85-Calibration value) ⁺⁵ ₋₁₅ %

- The level difference between the CH-1 and the CH-2 should be in the 5% or the less.
- When the specification is not satisfied, re-adjust the C recording current frequency response adjustment (Metal) within the specification. after the adjustment, perform the C recording current adjustment (Metal).

8-5-39. C REF Sync Position Tentative Adjustment (Metal)

• Setting

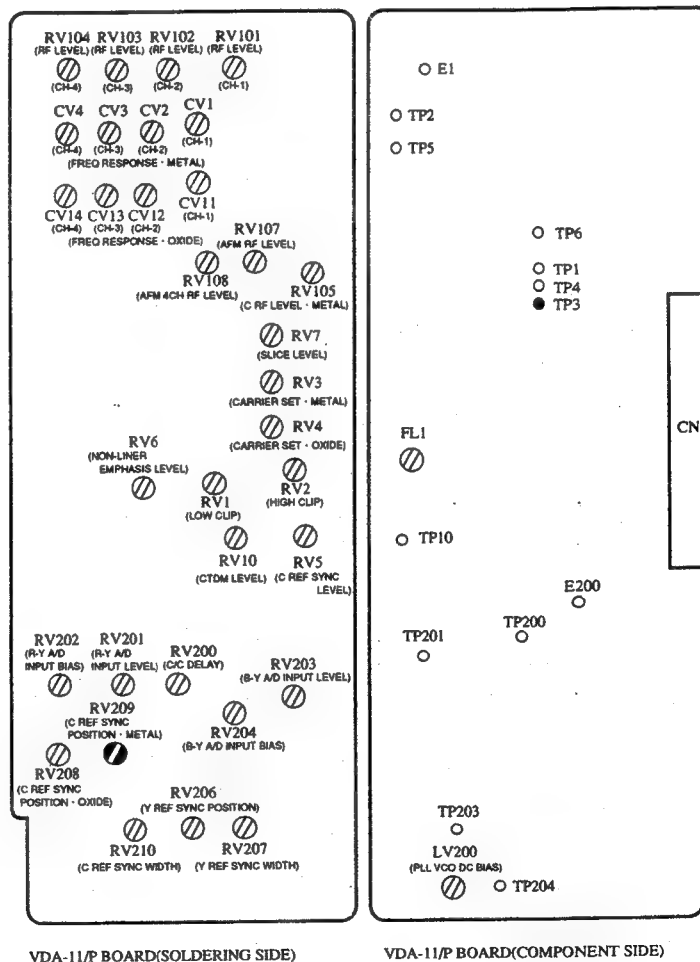
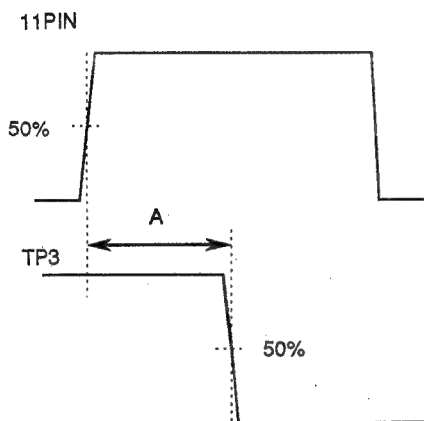
Equipment: Dualtrace Oscilloscope	Board: VDA-11P board
-----------------------------------	----------------------

• Preparation

- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP11/Extension board
TP3/VDA-11P
- Adj. point : ●RV209 (C REF SYNC POSITION METAL)/VDA-11P
- Spec. : $A = 670 \pm 10 \text{ nsec}$



8-5-40. C REF Sync Position Tentative Adjustment (Oxide)

• Setting

Equipment: Dualtrace Oscilloscope

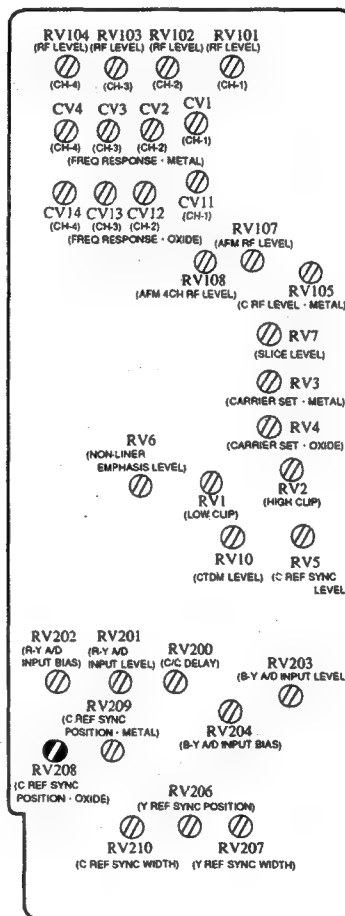
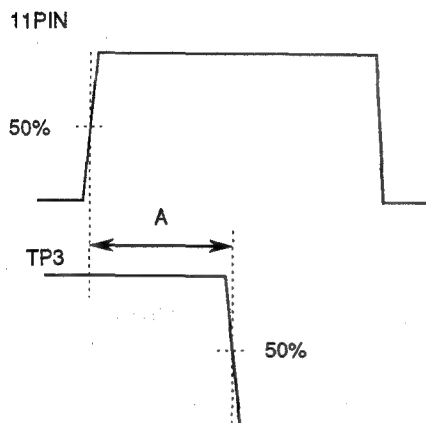
Board: VDA-11P board

• Preparation

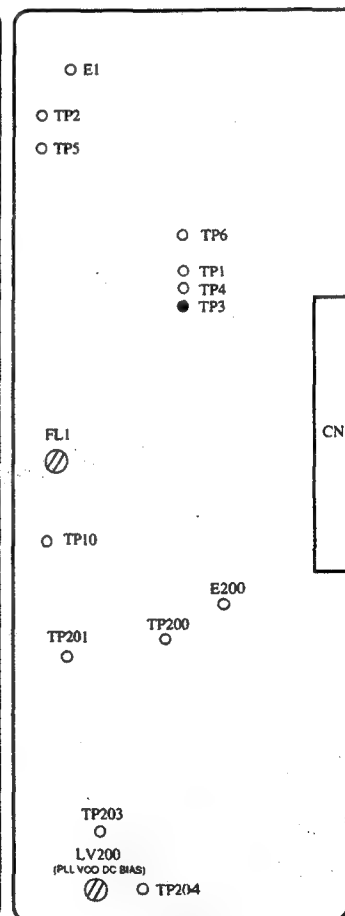
- built-in color-bar
- Insert the BCT-20G and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP11/Extension board
TP3/VDA-11P
- Adj. point : ●RV208 (C REF SYNC POSITION OXIDE)/VDA-11P
- Spec. : $A = 670 \pm 10 \text{ nsec}$



VDA-11P BOARD(SOLDERING SIDE)



VDA-11P BOARD(COMPONENT SIDE)

8-5-41. C/C Delay Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

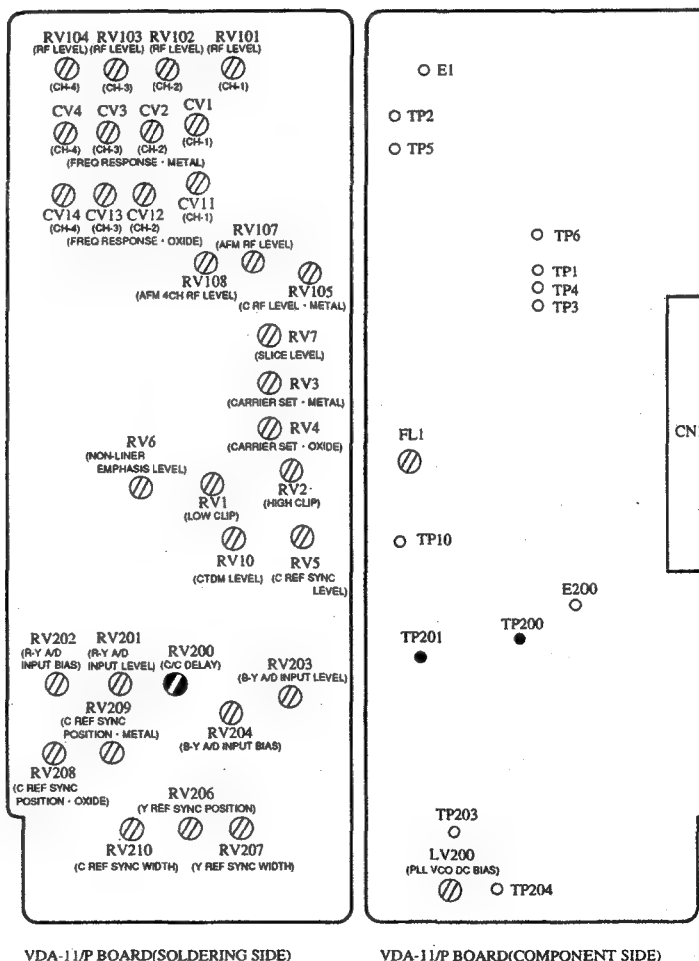
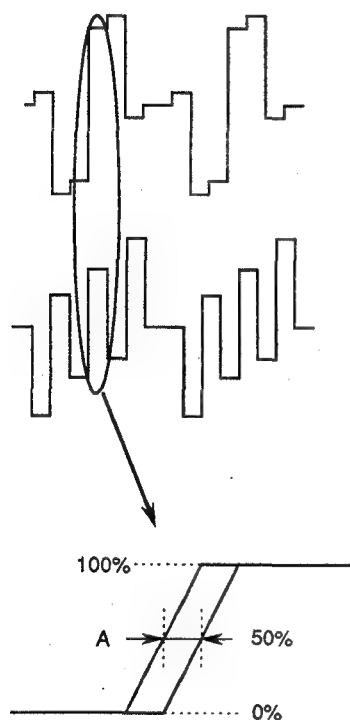
Board: VDA-11P board

• Preparation

- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP200/VDA-11P
TP201/VDA-11P
- Adj. point : ●RV200 (C/C DELAY)/VDA-11P
- Spec. : $A = 0 \pm 5 \text{ nsec}$



8-5-42. Composite Y/C Delay Adjustment (Metal)

Step 1.

- Note

• A standard VTR (BVW-75P or the equivalent) which is adjusted to the specified value is used in this adjustment.

- Setting

Equipment: Dualtrace Oscilloscope

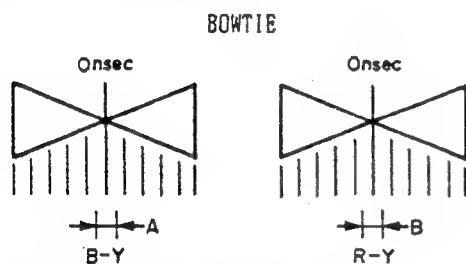
Board: VDA-11P board

- Preparation

- Input signal: BOWTIE (TSG-300)
- Insert the BCT-20M and put the unit into the REC mode.
- Play back the recorded tape using a standard VTR player.
- Set the Y/C DELAY control of a standard VTR player to PRESET.

- Adjustment procedures

- Test point : CAV Y } OUT/Standard VTR
CAV R-Y } (terminated by
CAV B-Y } 75 ohms)
- Spec. : A, B = ± 10 nsec



1. Check that the cross point of waveform is between A and B.
2. If the specification is not satisfied, check that the chroma signal is advanced or delayed.

Step 2.

• Setting

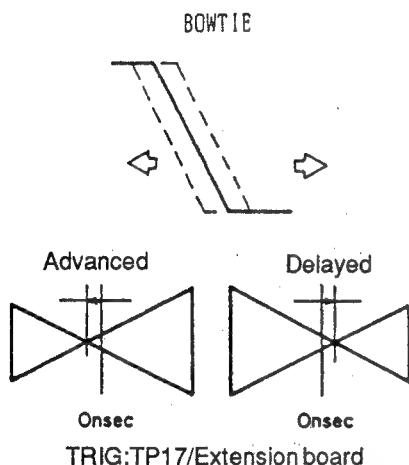
Equipment: Dualtrace Oscilloscope	Board: VDA-11P board
-----------------------------------	----------------------

• Preparation

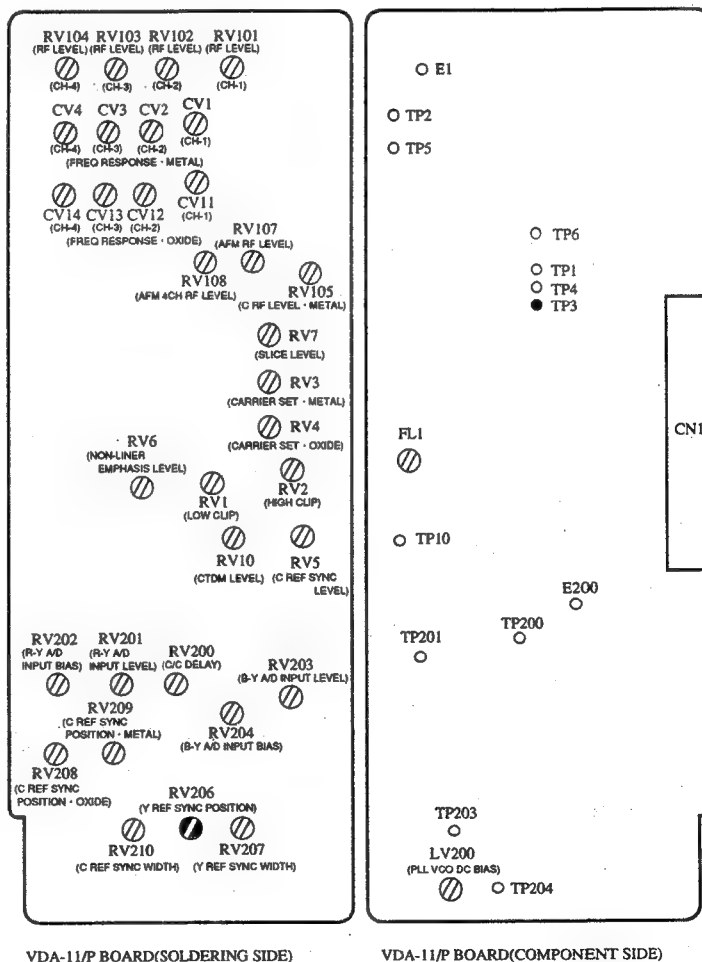
• Insert the BCT-20M and put the unit into the REC mode.
--

• Adjustment procedures

- Test point : TP3/VDA-11P
- Adj. point : ●RV206 (C REF SYNC POSITION)/VDA-11P
- Spec. :



1. When the chroma signal is delayed, correct the REF Sync signal in the right direction.
2. When the chroma signal is advanced, correct the REF Sync signal in the left direction.
3. Adjust Steps 1 and 2 repeatedly until the specification is satisfied.



8-5-43. Composite Y/C Delay Adjustment (Oxide)

Step 1.

• Setting

Equipment: Dualtrace Oscilloscope	Board: VDA-11P board
-----------------------------------	----------------------

• Preparation

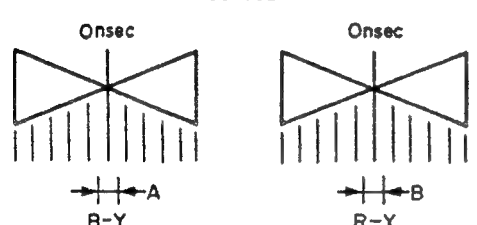
- Input signal: MOD pulse and bar
- Insert the BCT-20G and put the unit into the REC mode.
- Play back the recorded tape using a standard VTR.
- Set the Y/C DELAY control of a standard VTR to PRESET.

• Adjustment procedures

• Test point : CAV Y } OUT/Standard VTR
 CAV R-Y } (terminated by
 CAV B-Y } 75 ohms)

• Spec. : A, B = $\pm 10\text{nsec}$

BOWTIE



1. Check that the cross point of waveform is between A and B.

2. If the specification is not satisfied, check that the chroma signal is advanced or delayed.

• Note

- A standard VTR (BVW-75P or the equivalent) which is adjusted to the specified value is used in this adjustment.

Step 2

• Setting

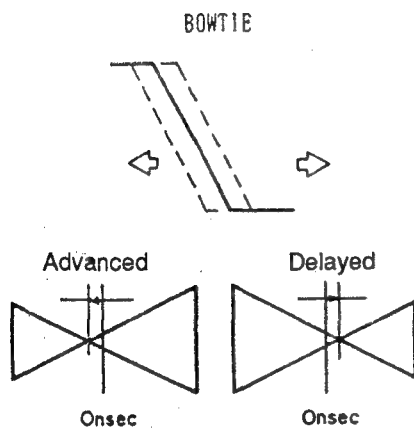
Equipment: Dualtrace Oscilloscope	Board: VDA-11P board
-----------------------------------	----------------------

• Preparation

- Insert the BCT-20G and put the unit into the REC mode.

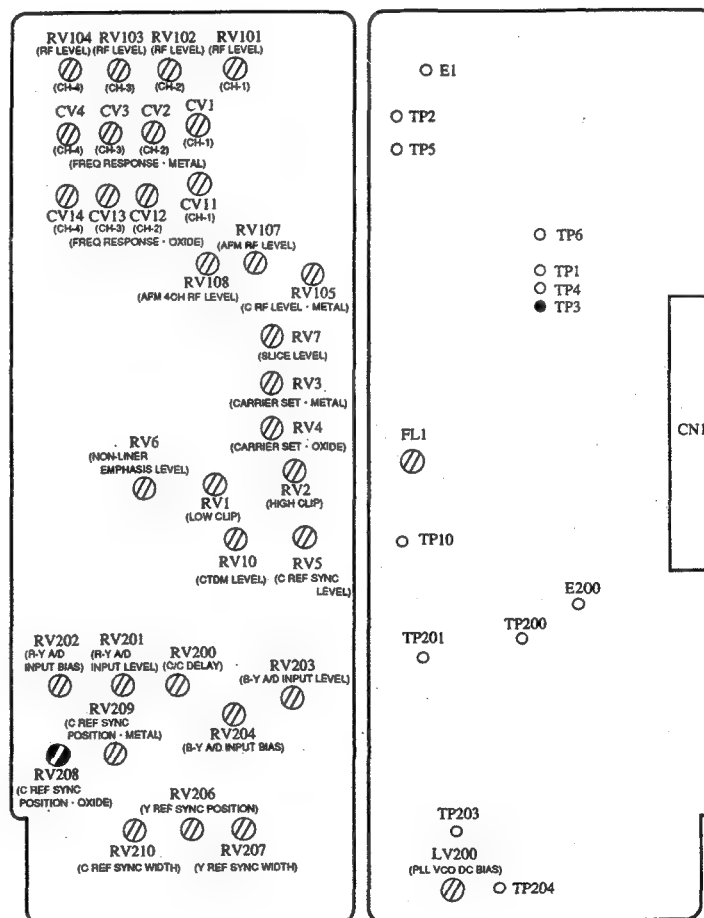
• Adjustment procedures

- Test point : TP3/VDA-11P
- Adj. point : RV208 (C REF SYNC POSITION OXIDE)/VDA-11P
- Spec. :



TRIG:TP17/Extension board

1. When the chroma signal is delayed, correct the REF Sync signal in the right direction.
2. When the chroma signal is advanced, correct the REF Sync signal in the left direction.
3. Adjust Steps 1 and 2 repeatedly until the specification is satisfied.



VDA-11P BOARD(SOLDERING SIDE)

VDA-11P BOARD(COMPONENT SIDE)

8-5-44. AFM-RF Balance Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

Board: VDA-11P board

• Preparation

- AUDIO IN CH-1/CH-2: No signal
- Insert the BCT-20M and put the unit into the REC mode.
- Play back the recorded tape using a standard VTR player (BVW-75P or the equivalent).
- REC mode→adjustment
- Play mode→check
- Player CAP Lock Mode "4 FIELD"

• Adjustment procedures

- Test point : CH-1 : IC602-14/VO-18 board:

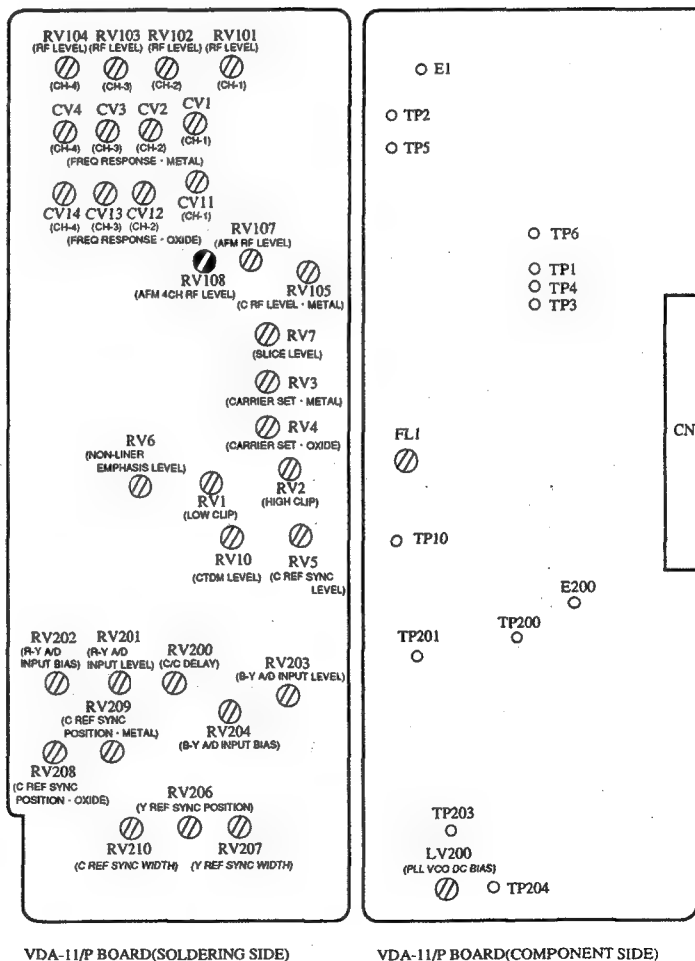
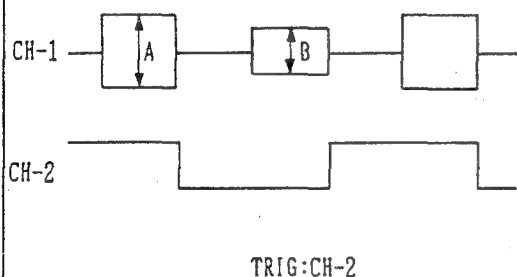
BVW-75P series

CH-2 : TP31/EN-48 board:

BVW-75P series

- Adj. point : ● RV108 (AFM 4CH RF LEVEL)/
VDA-11P

- Spec. : $A = B \pm 15\%$



8-5-45. Y PB RF Level Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

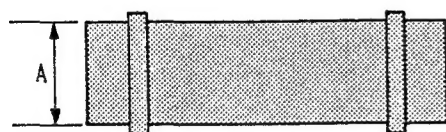
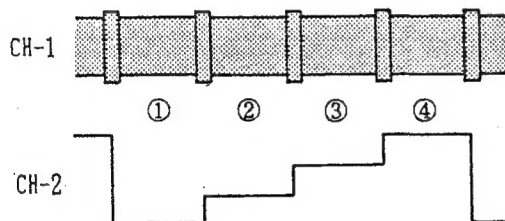
Board: VP-24P board

• Preparation

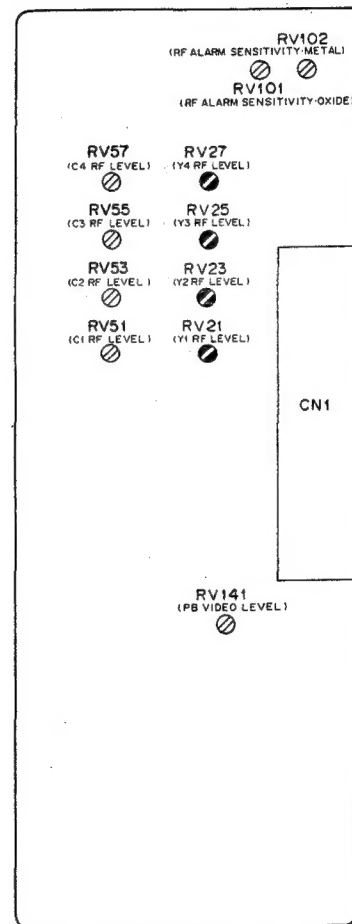
- Play back the flat signal on the alignment tape CR5-2APS.
- Make a tracking so that the RF level is maximum.

• Adjustment procedures

- Test point : CH-1 : TP33/Extension board
(Terminated by 75 ohms.)
CH-2 : TP25/Extension board
- Adj. point : ① : RV21 (Y1 RF LEVEL)/VP-24P
② : RV23 (Y2 RF LEVEL)/VP-24P
③ : RV25 (Y3 RF LEVEL)/VP-24P
④ : RV27 (Y4 RF LEVEL)/VP-24P
- Spec. : A = $220 \pm 20\text{mV}$



TRIG:CH-2



VP-24/P BOARD (COMPONENT SIDE)

8-5-46. C PB RF Level Adjustment

- Setting

Equipment: Dualtrace Oscilloscope

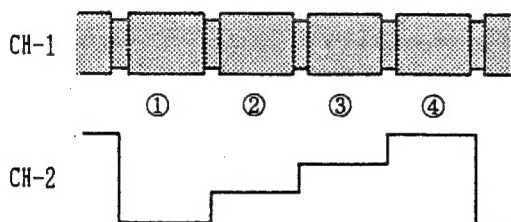
Board: VP-24P board

- Preparation

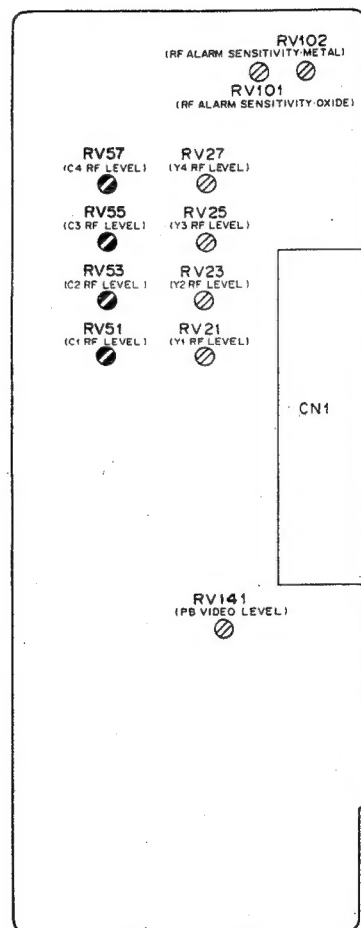
- Play back the flat field signal on the alignment tape CR 5-2APS.
- Make a tracking so that the RF level is maximum.

- Adjustment procedures

- Test point : CH-1 : TP31/Extension board
(Terminated by 75 ohms.)
CH-2 : TP25/Extension board
- Adj. point : ① : ● RV51 (C1 RF LEVEL)/VP-24P
② : ● RV53 (C2 RF LEVEL)/VP-24P
③ : ● RV55 (C3 RF LEVEL)/VP-24P
④ : ● RV57 (C4 RF LEVEL)/VP-24P
- Spec. : A = 220 ± 20 mV



TRIG : CH-2



VP-24/P BOARD (COMPONENT SIDE)

8-5-47. VF PB Output Level Adjustment

• Setting

Equipment: Dualtrace Oscilloscope

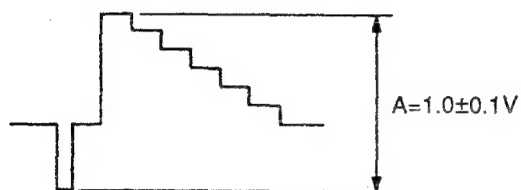
Board: VP-24P board

• Adjustment procedures

- Test point : TP38/Extension board
- Adj. point : Step 1.
 ● RV141 (PB VIDEO LEVEL) /
 VP-24P
- Spec. : $A = 1.0 \pm 0.1V$
 $B = 0.66 \pm 0.1V$

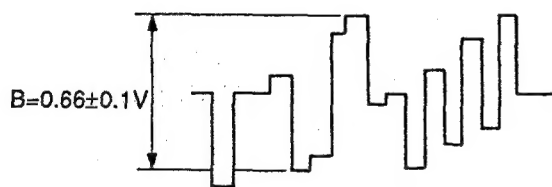
Step 1.

- Play back the color-bar signal on the alignment tape CR5-2APS.

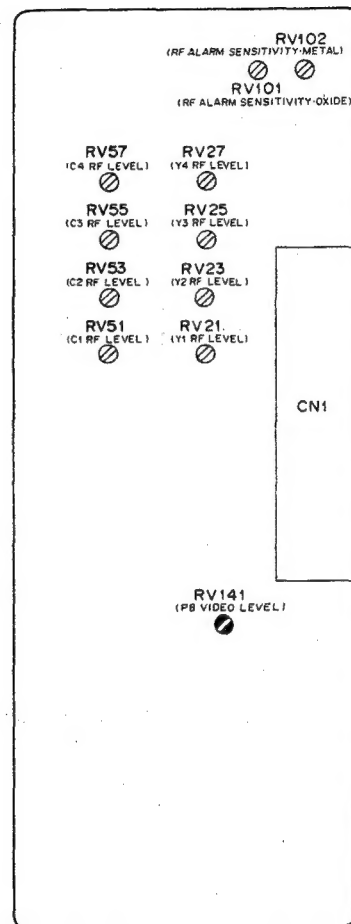


Step 2.

- Press the CTDM button.



Check that level A is $0.5 \pm 0.1V$



VP-24/P BOARD (COMPONENT SIDE)

8-5-48. RF Alarm Sensitivity Adjustment

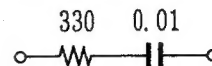
• Setting

Equipment: Dualtrace Oscilloscope	Board: VP-24P board
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• Preparation

- Input signal: built-in color-bar
- Connect the clip cord with CR between TP26 and TP1 on the extension board.

- clip cord with CR



• Adjustment procedures

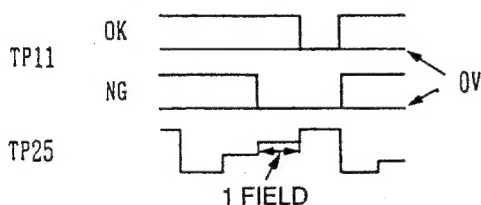
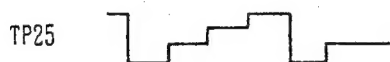
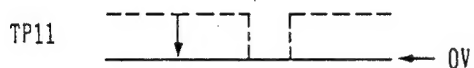
- Test point : TP11/Extension board:VP-24P

TP25/Extension board: VP-24P

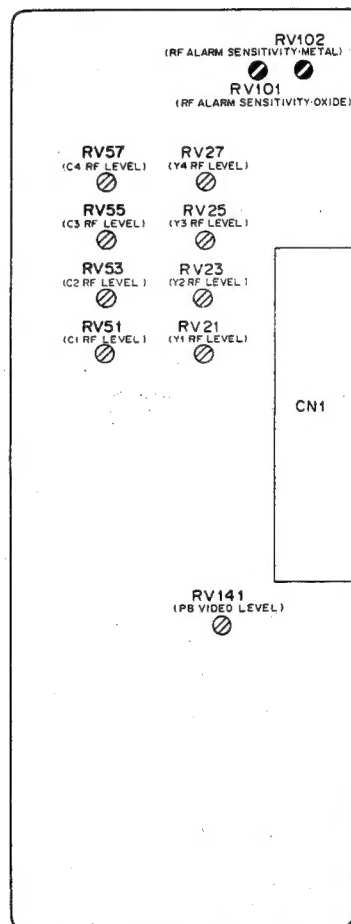
- Adj. point : • OXIDE adjustment
 • RV101(RF ALARM SENSITIVITY): OXIDE /VP-24P

- METAL adjustment
 • RV102 (RF ALARM SENSITIVITY: METAL /VP-24P

- Spec. : Adjust so that the pulse waveform of the TP11 becomes 0V level point.



1. Insert the BCT-20G and put the unit into the REC mode. (OXIDE adjustment)
2. After OXIDE adjustment, insert the BCT-20M and put the unit into the REC mode. (METAL mode)
3. After adjustment is completed, remove the clip cord.
4. Confirm that the waveform of the TP11 is not fall to 0V in over 2 fields continuously. When NG, readjust the 1~3.



VP-24/P BOARD (COMPONENT SIDE)